

MARINE REVIEW.

VOL. XV.

CLEVELAND, O., MARCH 4, 1897.

No. 10.

Iron Ore Pool—Lake Freight Matters.

As a result of a second meeting held on Monday of this week, it can be said that the chances of a continuance of the ore pool, including the Mesabi companies as well as all other producers of Bessemer ore in the Lake Superior region, are now more favorable than they have been at any time since announcement was made of the Carnegie-Rockefeller ore and transportation deal. When the first meeting was held two weeks ago, it was thought that the differences between the Minnesota company and the Rockefeller interests, due mainly to the advantages which the latter had secured on the Mesabi range through the agreement with Carnegie, were such as to prevent all possibility of a pool being made up that would include the Mesabi mines. But at the meeting of Monday last there was a partial clearing up of differences, and adjournment was taken for another week with the understanding that the two big interests were to meet in the meantime and endeavor to settle certain questions that will, if they are satisfactorily arranged, probably result in the entire pool being made up for another year. If a settlement is reached it will probably be due to concessions made to the Minnesota company by the Rockefeller interests on account of the latter's agreement with Carnegie. In event of no settlement being made between the Mesabi interests, the producers of Bessemer ore on the old ranges will go ahead with plans for a continuance of the pool, and it is thought that the prospects of success along this line are also more favorable than they were when the first meeting was held.

Most vessel owners are of the opinion that it would be to their interest to have the ore dealers fail in their efforts to make up a combination. Cheap ore and a free for all struggle for business would result, they think, in more ore being mined and used than would be the case under a restriction of prices and output. But there is an argument on the other side to the effect that reasonable prices (probably more than \$1 a ton reduction from last year's figures) will result in an early settlement of business for 1897, and in addition to giving furnace owners assurance of fixed and uniform prices for raw material, will ward off further reductions in wages and labor disturbances, which would undoubtedly follow a general struggle for business at low prices. There is some encouragement in the announcement that some of the steel makers who have recently undertaken big orders are anxious to arrange for some of their 1897 ore, and that sales will very probably follow soon after a settlement of the question whether there will or will not be a pool.

Coal shippers have in a few cases been asking vessel owners for lake freight estimates on a few blocks of soft coal to go to Lake Michigan, but this inquiry is only preliminary and is made with a view to securing a basis on which business would be solicited. Average rates on soft coal from Lake Erie ports last season were: To Milwaukee, 33½ cents; to Duluth, 29½ cents; to Escanaba, 27 cents; to Green Bay, 32½ cents; to Manitowoc, 44 cents.

The announcement that M. A. Hanna & Co. of Cleveland have been made sales agents for the entire coal business of the Wheeling & Lake Erie Ry. Co. is a matter of considerable importance, as the tonnage of that company in soft coal amounts to some 700,000 or 800,000 tons, but a large part of it is, of course, a railroad trade.

Great Britain's naval programmes are of a stunning kind. In the estimates for 1897-98 the expenditures are placed at \$109,190,000. Four battleships, three third-class cruisers, two sloops, four gunboats, two torpedo destroyers and a new royal yacht will be commenced, making 108 ships building, of which number sixty-six will be completed during the year. There will also be an increase of 6,179 men and 121 officers in the navy.

Hughes Bros. & Bangs, public works contractors of Syracuse, N. Y., who are to build the Delaware breakwater, have placed an order with the Jackson & Sharp Co., Wilmington, Del., for four scows, each 180 feet long, 40 feet beam and 12 feet deep. Three of them will be dumping scows to carry 1,200 tons each and the other a deck scow to carry 1,500 tons.

Gas Buoys Galore—Full List of Appropriations.

The executive officers of the Lake Carriers' Association are certainly entitled to a great deal of credit for having secured, in the last days of the retiring congress, an appropriation of \$25,000 for gas buoys, as well as a small appropriation for lights at Ballard's reef, Detroit river, which will still further obviate the necessity of vessel owners assuming additional private light expenses. River and harbor appropriations in the sundry civil bill, a list of which is printed herewith, are of great importance, but with the vessel interests this item of \$25,000 for gas buoys takes first place, as it was most difficult to obtain and will undoubtedly result in a big saving on private light obligations that would have to be undertaken if the buoys were not furnished by the government. Although practically nothing in the way of appropriations for aids to navigation was secured in the house, Messrs. Keep and McKay of the association decided upon a final effort before the commerce committee of the senate, and upon visiting Washington they found Senators McMillan and Burrows, as well as Congressman Burton, ready to render them all possible assistance. A few days of diligent work among the senators resulted in appropriations fully up to their highest expectations.

This appropriation of \$25,000 will furnish gas buoys to mark dangerous rock shoals in the St. Mary's river, in the Straits of Mackinac, and in Poverty passage, entrance to Green bay. Probably as many as eight of them, if they can be secured from the appropriation, can be advantageously used to mark boundaries of the new St. Mary's river channels. One will probably take the place of the light-ship recommended for Mud lake, St. Mary's river; another will probably be placed on Graham shoals, Straits of Mackinac, and still another will take the place of a light proposed for the vicinity of Middle island, Lake Huron, to guide vessels into the natural harbor of refuge behind the island. The full list of appropriations contained in the sundry civil bill as passed by both houses of congress is as follows:

Aids to navigation—Gas buoys for several points on the lakes and connecting rivers, \$25,000; small light-vessel and two float lights to mark new channel at Ballard's reef, \$1,500; additional light on shore at Grand Marais harbor of refuge, Lake Superior, \$2,000, to be taken from unexpended balance of \$15,000 remaining after construction of light and fog signal station at that point; for completing Chequamegon point light and fog signal station, \$1,500; gas buoys in St. Lawrence river at Charity shoals, Feather Bed shoals, Rock island point, near Sister island light, at Sunken Rock, at Bay state shoals, at Lower Narrows and at entrance to upper harbor, Ogdensburg, \$7,600.

River and harbor items—Completing 20-foot channel, \$1,090,000; continuing improvement at Buffalo, \$412,590; completing improvement at Dunkirk, \$398,258; continuing improvement at Cleveland, \$300,000; completing harbor of refuge at Milwaukee, \$168,737.91; Duluth and Superior harbors, continuing improvement, \$375,000; continuing Chicago river improvement, including widening and straightening of the river, \$113,000; continuing improvement of Portage lake canals and other parts of waterway across Keweenaw point, \$300,000; for surveys and examinations of deep water routes from the lakes to the Atlantic seaboard, \$150,000; printing and issuing lake charts and electrotyping plates for charts, \$2,000 for surveys, additions to and corrections of plates for lake charts, \$25,000.

There is also in the bill an item of \$200,000; for completing the two lake revenue cutters, for which bids are to be opened in a few days, as well as \$2,000 for improvement of the United States marine hospital grounds at Cleveland, and a clause directing the secretary of war to cause to be made a survey and estimate of cost of deepening and widening the straight channel in Maumee river and bay, with a view to obtaining and permanently securing a channel of a uniform width of 400 feet and 20 feet deep at low water, the cost of said survey to be paid out of the money already appropriated for the improvement of said channel.

W. E. Hingston of Buffalo has secured a contract for Buffalo river dredging from the city at 15½ cents per cubic yard.

Restoration of the Merchant Marine.

THE LAKES AS AN OBJECT LESSON IN DISCUSSING THE SUBJECT.—A
LETTER FROM MR. FRANK J. FIRTH OF PHILADELPHIA.

Editor Marine Review:—I am in receipt of your invitation to send you my views upon what you properly designate a "great question," i. e., how are we to bring about the restoration of the merchant marine of the United States upon the oceans?

It is a well known fact that Great Britain and other nations have absorbed the foreign carrying trade, almost to the entire exclusion of the United States merchant marine. The great question is as to whether this state of affairs can be remedied by legislation and, if so, what the character of this legislation must be. There are a number of our citizens who have no faith in what may be styled commercial legislation. They believe in the "survival of the fittest" and in an absolute freedom for everyone on the face of the earth to buy and sell all kinds of material and labor where it can be done to the best advantage of the individual. They believe in no restriction, restraint or encouragement of any sort by legislative act. To such theorists the restoration of the American merchant marine is an exceedingly simple matter. It is only to repeal all existing legislation and allow our people to buy ships where they can get them the cheapest, whether this be in Great Britain or Japan, and to man and supply them in the lowest priced markets of the world, whether this be Italy or China. This may be designated the "free ship" theory. It is not the theory of the political party that will for the next four years direct the governmental policy of this country.

As opposed to the "free ship" theory we have a policy that proposes to legislate so as to make it possible for American citizens to own and operate ocean going steam or sail vessels, built in American ship yards and commanded by American citizens, in competition with the vessels of all other nations. To those who have no faith in the creation of ship building industries and fleets of merchant vessels under the artificial conditions that are the outgrowth of legislative action, we point to the great lakes region. Under the wise coasting laws of the United States the carriage of our products from one port in the United States to another is restricted to United States vessels. What has been the result? Almost every important city on the American side of the lakes has one or more thriving ship building industries that not only create and sustain active local populations, but that also contribute towards the support of many interior mining and manufacturing districts from which fuel and supplies are drawn. On the Canadian side of the lakes there is no such development. There are no ship building industries and no such important communities as are found on the American side. And what has been the effect of this legislation on the American lake marine and on the carriage of the products of our country by vessels on the lakes? Stimulated by this beneficial protective legislation, citizens of the United States have united in creating a lake marine that is one of the wonders of the world in its extent and economy of service. Nowhere on the face of the earth are the products of any country handled and transported with the uniform efficiency and cheapness that is found upon our great lakes. This grand result has been wholly the product of beneficial national legislation. With this object lesson before our people they may well be encouraged to seek until they find some legislative method that will be equally successful in developing and sustaining an American merchant marine upon the oceans and a prosperous ship building industry, without which no nation can be powerful in time of peace or war.

What shall this method be? The difficulties in the way of a restoration of our ship building industries and our merchant marine upon the oceans are readily located. It costs, at present, more money to build vessels in this country than in Great Britain and elsewhere; and it costs more money for labor and supplies where vessels are operated under our flag and laws than it costs the vessels of other nations. These are the two sets of difficulties that are clearly recognized and that must be met in some reasonably permanent manner before we can hope to induce American capital to seek investment in owning and operating American vessels upon the ocean. Every intelligent proposition to stimulate our ship building industries and ocean vessel ownership must contemplate the direct or indirect use of the national revenues to the extent that may be necessary to place the owners of American merchant vessels in as favorable a position as to ownership, maintenance and operation as their foreign rivals. Various methods have been proposed and none of them are entirely free from objection.

The problem has not yet been solved. It is attracting widespread and intelligent attention and investigation upon the part of those who recognize both its importance and its difficulties. The general investigation and interchange of views now in progress will result in a concentration of effort upon some policy that it is hoped will be given a fair trial and be amended from time to time as the necessity for such amendment is demonstrated.

On another occasion I may venture an opinion as to what I think this policy should be. Discriminating duties, bounties, mail and other subsidies, etc., are all receiving consideration and being subjected to the fire of criticism. It is well at present to investigate and reserve judgment as to details. The legislative committee of the Lake Carriers' Association has, I think, acted wisely in deciding to keep in touch with the movement for the enactment of proper national legislation for the restoration of the merchant marine of the United States upon the oceans.

Frank J. Firth.

Philadelphia, Pa., Feb. 24, 1897.

Postal Delivery Service at the Sault.

Editor Marine Review:—I feel quite certain that any effort in the direction of securing the delivery of mail to vessels passing at Sault Ste. Marie will meet with the support of the lake shipping interests, as much so as the Detroit river service. If you recall a letter of mine to you last fall with reference to marine postoffices at Duluth and West Superior you will see where I stand on the question. As regards to the service at the "Soo" I will cite an instance in which I was concerned last fall, and very likely others have had the same experience. I wrote a letter to the captain of our steamer Centurion and was very anxious to get a prompt answer to it. I knew he would pass the Detroit river before I could reach him there, so sent it to Sault Ste. Marie, Mich. It happened that he went up that trip and also came down through the Canadian lock, so that it was some three weeks later before I received a reply with an explanation as to why the letter had not been answered promptly. With two or three locks in operation, on two sides of the St. Mary's river, there is certainly a demand for a change from the old method, which was all right formerly, but is now inadequate. The vessel captain is bound to take the lock in which he can secure the quickest passage. If one side of the river is crowded he must head for the other, regardless of any mail that may be awaiting the vessel or her crew at the point that is missed.

H. E. Schmuck.

Springfield, Mass., March 1, 1897.

Discriminating Duties.

Editor Marine Review:—I note your editorial reference to "discriminating duties" and a quotation from the "protest of the Philadelphia Maritime Exchange." I would like to inquire if it is your understanding that the "tax of 10 per cent." is to be given to the ship owner? The wording of the protest seems to imply this understanding. If the tax mentioned is to be collected and given to ship owners, the measure is a very strange one, but if not, the public might better be informed.

Wm. W. Bates.

No. 38 West Second avenue,
Denver, Col., Feb. 25, 1897.

A copy of the Elkins bill, which is the principal measure involving discriminating duties, is not at hand, but it is not understood that this bill proposes to give to ship owners the funds collected from imposing an additional duty of 10 per cent. ad-valorem on goods imported in ships not of the United States. If the protest of the Philadelphia Maritime Exchange, to which Mr. Bates refers, conveyed any such impression it was very probably in error.—Editor.

At the annual meeting of the Association of American Draftsmen in Washington the following officers were elected: President, Sidney I. Besselièvre; senior vice-president, William A. Dobson; vice-presidents, William T. Powell and James W. Sims; secretary, Frank R. Wheeler; assistant secretary, Joseph W. Byrne; treasurer, Alfred Klakring; members of council, Joseph S. Latimer and A. M. P. Maschmeyer; editorial staff William A. Dobson, C. C. Dodge and Wm. T. Jones. The secretary's address is bureau of construction and repair, navy department, Washington, D. C.

Solid through trains with sleepers between Chicago, Buffalo and New York City, are run daily via Nickel Plate road. Dining cars attached.

1 Mar 31

Largest Freight Steamer in the World.

An illustration on this page of the big freight and passenger steamer Pennsylvania is accompanied by dimensions of the vessel. The illustration was prepared for the Scientific American, and gives an impression of the imposing appearance of the ship as she made her way up the Hudson river recently on her first trip to New York. On her return to Hamburg from New York the Pennsylvania took out an immense cargo of miscellaneous merchandise in addition to 294,069 bushels of grain, which latter was equivalent to 6,847 tons weight.

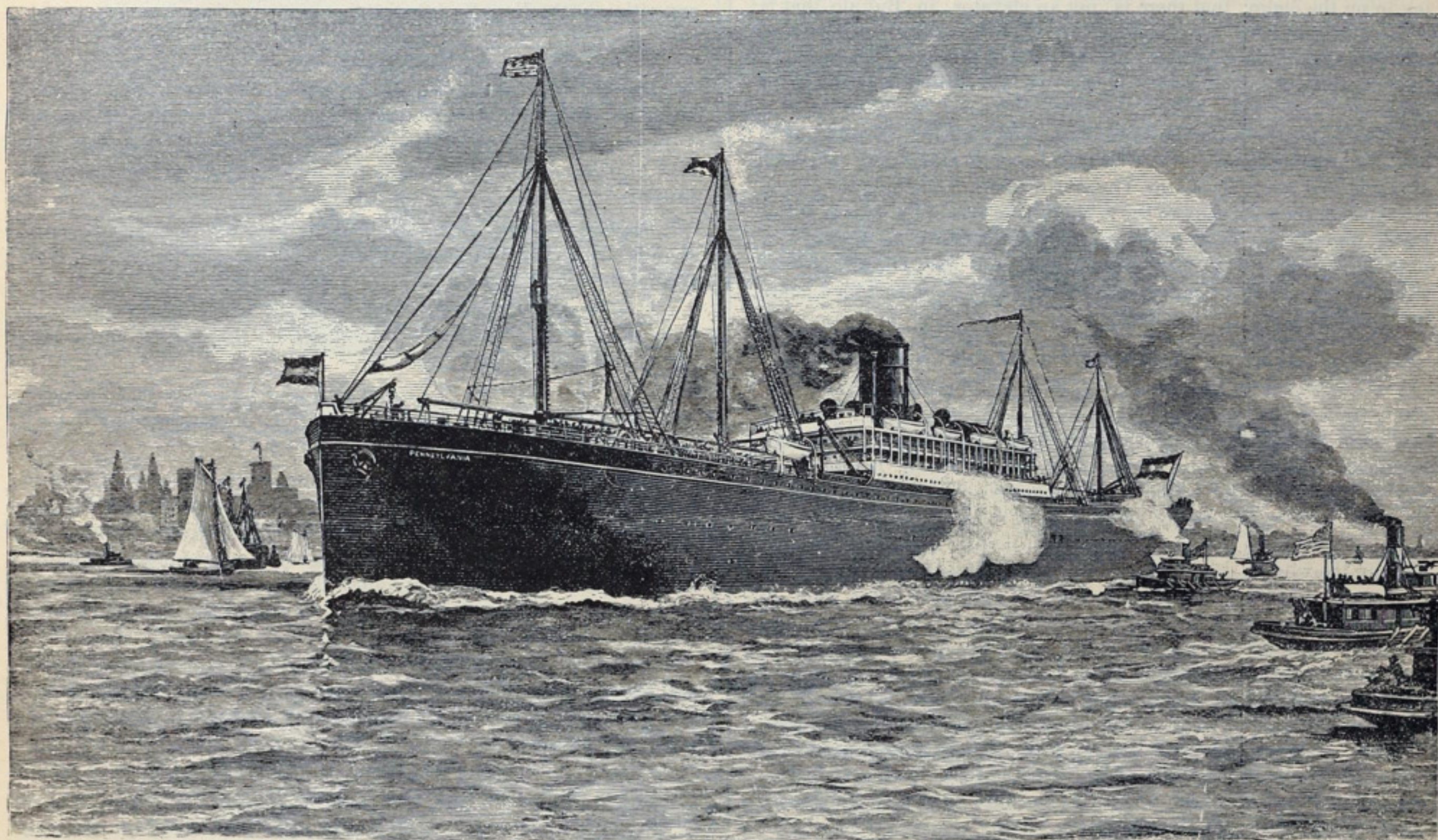
	Length, feet.	Beam, feet.	Depth, feet.	Speed, knots.
Great Eastern.....	680	83½	58	11
Campania.....	600	65½	43	22
Pennsylvania.....	560	62	42	14½

It has been said that the Pennsylvania rivals the Great Eastern, but a comparison of dimensions of the two ships, made in the accompanying table, shows that the new cargo boat, big as she is, is yet a long way behind the leviathan of forty years ago. The Pennsylvania is, however, a ship of greater displacement than the big Cunarders Cam-

using the high pressure of 210 pounds per square inch. There are forty-five auxiliary engines scattered throughout the ship, among which are included twelve steam winches and eight steam cranes for handling the cargo. In addition to her enormous cargo capacity, the Pennsylvania has a large passenger accommodation, being able to carry 200 first cabin passengers, 150 second cabin, and 1,000 in the steerage. The passenger accommodations are arranged upon the main, upper, awning, saloon and promenade decks. In the fleet of the Hamburg-American line of sixty-nine vessels there are eighteen twin-screw steamers of over 7,000 tons each. The total tonnage of the line is 339,160.

Big Duluth-Superior Bridge.

Shortly after the opening of navigation a great bridge structure, costing about \$1,000,000 and spanning the passage between Rice's point on the Minnesota side and Connor's point on the Wisconsin side, will connect the cities of Duluth and Superior. It is said to be the third largest draw bridge in the world and will be suited to use by foot passengers, vehicles, street cars, and railroad trains, there being double tracks for trains and street cars, with ample facilities for all traffic liable to oc-



HAMBURG-AMERICAN LINER PENNSYLVANIA—LARGEST FREIGHT STEAMER IN THE WORLD.

Length, 560 feet; beam, 62 feet; depth, 42 feet; maximum draught, 30 feet; displacement, loaded, 23,400 tons; horse power, 5,500; speed, 14½ knots.

pania and Lucania, although the two passenger steamers exceed her in some of their dimensions. The Cunard boats do not draw so much water as the big freighter, and the lines of their hulls, built for speed, are very much finer. When loaded to her full capacity, the Pennsylvania's keel is 30 feet below the surface of the water, and a person standing on the promenade deck will be about 40 feet above the water when the ship is at her normal draught. When she entered the Hudson river her draught was light, and the boat deck, from which the navigation of the ship is carried on, must have been over 50 feet above the water line. It is this great height that deceives the eye as to her length.

This steamer has eight decks in all, five of which—lower deck, between deck, main deck, upper deck and awning deck—extend throughout her full length. Above the awning deck is a structure between 200 and 300 feet long, in the center of the ship, which contains the saloon deck, the promenade deck and the boat or bridge deck. The total height from keel to the boat deck is 72 feet. Engines are of the twin-screw triple expansion type and of 5,500 horse power. Steam is supplied by three double ended and three single ended Scotch boilers,

cur in the future. At the present the waters between Minnesota and Wisconsin are spanned by only two other bridges, the Northern Pacific and St. Paul & Duluth company's bridges, which being exclusively for trains, do not permit of expansion of traffic in other lines. No contracts have as yet been closed for the use of the new bridge by railroads, but it is expected that the extension of traffic will result in a lease of this privilege shortly. Two bridges over the Hudson at New York are said to be the only structures having a larger draw than that of the Duluth-Superior bridge. The length of the bridge between dock lines is 1,094 feet. It is solidly built on five piers, a big center pier supporting the draw. The draw span is 491 feet in length and weighs 1,800 tons, and the work of raising it is now progressing from false work built on the ice. On either side of the center pier the space for vessels will be 200 feet 6 inches in the clear, and under each rafting space there is 267 feet of water in the clear. The bridge is 20 feet above high water level, permitting of the passage of small boats without swinging the draw. The motive power is electricity, and the bridge can be swung clear around in two minutes. The entire work was designed by Alfred D. Roller of New York.

New Brokers—Against the Elevator Pool.

Buffalo, N. Y., March 3.—All other subjects have given place in marine circles here to the talk of a new vessel brokerage firm and to speculation as to the extent to which the Armour interests of Chicago will enter into competition with the elevator combination. Smith, Davis & Co., underwriters, are back of the arrangements for a new vessel agency. They have been talking the matter up with vessel owners in different parts of the lakes, and it is said that their plan is to operate on a kind of mutual basis with representatives in Chicago, Cleveland and Duluth, but as yet there is no definite organization. It is well understood, of course, that this insurance firm is displeased with the action of Edward Smith of Brown & Co. in joining the new insurance combination.

It is quite generally understood now that President J. J. Hill of the Great Northern Railway Co. is not the important factor in the new steel elevator project, although he is interested in it. The Armour interests will operate the elevator in connection with their big Chicago houses, and everything seems to point to strong opposition to the elevator pool, which has monopolized the grain business here for a great many years past. The Chicago people are said to be starting in on the claim that there is not an elevator in Buffalo that is modern in construction. The new house will be entirely of steel and of 2,500,000 bushels capacity. Thirty bins in the new structure will have capacity of about 80,000 bushels each, and they will also be of steel.

The immense grain business of the lakes during the past season has also prompted new elevator projects at ports other than Buffalo. It is said that Mr. Hill of the Great Northern contemplates adding 2,500,000 bushels capacity to the 3,500,000 bushels of his system at Superior, and that the new house will in all probability be of steel. A new elevator for the Anchor line at Erie will have 600,000 bushels capacity, and the Big Four company has just let a contract for a house in Cleveland of 500,000 bushels capacity.

Changes in Steamboat Regulations

At the recent annual meeting of the United States board of supervising inspectors of steam vessels a rule was adopted which provides that no original first-class pilot license on the northwestern lakes shall be issued hereafter to any person who has not been licensed and served at least one full season of eight months as second-class pilot on steamers, such service as second-class pilot to have been within two years preceding the application for such license. Another amendment in the rules is to the effect that any applicant for examination for license or for increase of grade who has been refused for want of knowledge or for other qualifications must wait a year before undergoing re-examination. Pilot rules are generally amended so as to conform to the new law governing boats propelled by gas, fluid, naphtha, or electric motors, and the following rule has been adopted for lights on scows without rudders or other means of guidance in tow of steam vessels: "All such scows shall carry a regulation white light at each end of each scow, such lights to be carried not less than 6 feet above the deck. When scows are towed two or more abreast, they shall carry the regulation white lights."

Ship Yard Matters.

The full appropriation for the two new lake revenue cutters, for which bids will be opened in Washington on the 15th inst., and which will be in some respects better vessels than the Walter Q. Gresham, is now secured to the revenue cutter service. An item of \$200,000 to complete these vessels is contained in the sundry civil appropriation bill, just passed by congress. It is expected that one of these cutters will be stationed on Lake Erie and the other on Lake Michigan.

Although the Goodrich Transportation Co. of Chicago is slow about getting around to the contract for a new steamer that has been talked about for a long time past, it is quite certain that the vessel will be built before the spring of 1898. The type of vessel contemplated is a steel screw steamer somewhat shorter than the Virginia, probably 250 feet long. She will be heavily plated and probably double framed forward.

In accordance with arrangements made recently with its creditors, the firm of F. W. Wheeler & Co., West Bay City, has filed a trust mortgage in favor of the Union Trust Co. of Detroit for \$250,000. It is to cover the payment of 6 per cent. gold bearing mortgage bonds, payable in installments of \$50,000 each, the first installment coming

due on March 1, 1899, and the payments following on the same date in each of the four succeeding years.

Two new St. Lawrence river passenger steamers, to ply between Toronto and Prescott, are still talked of by the Richelieu & Ontario Navigation Co., but it is understood that Canadian builders have not been asked for bids as yet, as it is not intended to have the vessels go into commission until the spring of 1898. The steamers are to be about 265 feet long and of high speed, probably better than twenty miles an hour.

There is absolutely no foundation for the statement that the Cleveland Steel Canal Boat Co., which has been operating a fleet of canal vessels between Cleveland and New York for some time past, will build any more boats for next season. The company contemplates no building at this time. Ship builders who have placed any faith in the plans of Erastus Wyman and his associates for a big Erie canal boat combination will also be disappointed, at least as far as the immediate development of these plans is concerned. It is understood that the rates of freight involved in contracts which were said to have been made with northwestern millers were ridiculously low, and anyhow the Wyman scheme is meeting with a great deal of opposition in the New York legislature.

Around the Lakes.

One of President Cleveland's last official acts was to sign a resolution granting a life saving medal to Daniel E. Lynn of Port Huron.

Col. Jared A. Smith, United States engineer at Cleveland, has been in poor health for some time past and has gone to Georgia to recuperate.

President George Uhler of the Marine Engineers' Beneficial Association is still engaged in visiting different branches of the organization around the lakes.

It is probable that a change from red to white will be made as early as possible next season in the light on Passage island, northeast of Isle Royale, Lake Superior.

Supt. Seeley of the Erie canal says very positively that the canal will be open as early as usual in the spring, notwithstanding the extensive improvements that are now under way.

The Columbus, Sandusky & Hocking Railroad Co. is reported to have closed a contract with Webster, Camp & Lane of Canton, O., for a car dumping machine, to be used on Sandusky coal docks.

D. S. Austin, a well known and highly respected citizen of Buffalo, died at his home in that city a few days ago. He was seventy-two years of age. Mr. Austin was at one time engaged in the ship chandlery business at Buffalo.

Capt. Richard Horsefall of Bay City, aged seventy-two years, and who has sailed for sixty-one years, is still in the harness. It is said that he will have one of the vessels of the Mills Transportation Co. again next season.

Capt. A. B. Davis of the revenue cutter service, who has just been transferred from the old cutter Andrew Johnson to the new Walter Q. Gresham, says the Johnson will be sold. The Gresham will take the place of the Johnson in the St. Mary's river patrol next season.

A combination of coal companies at the head of the lakes, which has been under way for some time past, is now about perfected. The companies are the Pennsylvania & Ohio Fuel Co. of Duluth, the Lake Superior Coal Co. of Ashland and the Manitowoc Coal & Dock Co. of Manitowoc. The new company will be known as the Pennsylvania & Ohio Fuel Co., with a capital of \$500,000 and headquarters at St. Paul.

Breyman Bros. of Toledo, who recently secured a big job of dredging at Boston, are negotiating with the Bucyrus Steam Shovel and Dredge Co. of South Milwaukee for a big machine that will rank as the largest dipper dredge in the United States. The dipper is to be of 9 cubic yards capacity. It is the intention to have the hull built at or near Boston and the machinery at South Milwaukee. The Breyman's are to have built also, at Toledo and Marine City, four dump scows of 700 cubic yards capacity each.

A Very Desirable

train to take when going to New York is Pennsylvania No. 6, leaving Union station 1:40 p. m. daily and from Euclid avenue 1:50 reaching New York 7:40 next morning. Pullman sleeper through without change. Supper served in dining car.

Capt. Chriss Peterson.

On the fourth of July, fifteen years ago, Captains John and Alfred Mitchell, now in control of a very large fleet of lake vessels with offices in Cleveland, were at Frankfort, Mich., with a lumber tow made up of the small steamer Gratwick (now the Mary Pringle), and the barges Fryer and Marvin. All hands had worked until noon, when they "knocked off" to join in a celebration that was in progress up town. The attention of two or three men from the vessels, among them Capt. Al. Mitchell, was directed to a young Norwegian, robust in appearance



and a picture of health. He had little knowledge of English or the people around him, but was intently watching the sports in which he seemed to be very much interested. He was approached by one of the men from the Gratwick tow, who was also from Norway. It was learned that at nineteen years of age he had graduated from one of the navigation schools of his native country and had several years of practical experience on steam and sail vessels before coming to the lakes. Capt. Mitchell became interested in him and gave him a place before the mast on the barge Fryer.

This young man was Capt. Chriss Peterson, who died at Marine City on Wednesday last. He had been under pay with the Gratwick-Mitchell vessel interests every day, in and out of season, since he was first taken aboard a lumber barge at Frankfort, and at the time of his death held the highest position among men of that employ. He was appointed mate of the Fryer the next spring after he shipped on her and two years later was given command of the schooner Reindeer. Then he was taken into the steam vessels of the line, first as mate with Capt. John Mitchell in the wooden steamer W. H. Gratwick. In 1891 he was given command of the Gratwick and sailed her for two years, taking command later of the Robert L. Fryer and the W. F. Sauber. His last command was the J. J. McWilliams, which he gave up last fall on account of sickness. He has been in poor health for several months past, and it is thought that his death was due primarily to a severe cold contracted some time ago in Chicago. Capt. Peterson was a few days short of forty-one years of age. He leaves a widow and four children.

Although the general agents of insurance companies on the lakes who have maintained the Inland Lloyds Vessel Register for a great number of years past were apparently indifferent about an issue of the book for the present year, they have finally decided to go ahead with a partial revision of last year's register. No attempt will be made to carry on a general survey of vessels. Changes in ratings or valuations will probably be made only in special cases where the agents or their inspectors know of conditions that warrant changes.

Capt. John W. Farwell, who had followed the lakes for more than forty years, and who was for a long time in the employ of J. C. Gilchrist, died at his home in Sandusky, Tuesday.

Appointments of Captains and Engineers.

Buckeye Steamship Co., Cleveland: Steamer—City of Glasgow, Capt. John McNeff, Engineer C. R. Price.

Mather, W. G., Cleveland: Steamer—E. S. Pease, Capt. Thos. Sloan, Engineer ———. Schooner—Capt. Frank Parrson.

Rhodes, R. R., Cleveland: Steamers—Yale, Capt. John Coulter, Engineer Harry Stone; Neshoto, Capt. W. H. Humphrey, Engineer J. P. Klosen; R. R. Rhodes, Capt. P. Dowdell, Engineer C. Beebe.

Mentor Steamship Co., Cleveland, Thomas Fitzpatrick, managing owner: Steamer—George T. Hope, Capt. K. A. Jensen, Engineer C. H. Gumlich. Schooner—John C. Fitzpatrick, Capt. T. T. Tallexsen.

Great Northern Transit Co., Collingwood, Ont.: Steamers—Majestic, Capt. P. M. Campbell, Engineer W. Lewis; Pacific, Capt. R. D. Foote, Engineer J. W. Aston; Northern Belle, Capt. C. Jaques, Engineer F. Cleland.

Mutual Transportation Co., Cleveland: Steamers—Coralie, Capt. Wm. Cumming, Engineer Chas. J. Love; Corsica, Jas. A. Walsh, Engineer Andrew Haig; Corona, Capt. Stephen Murphy, Engineer Grant Donaldson; Cambria, Capt. Martin Johnson, Engineer Fred. Warning.

North Shore Navigation Co., Collingwood, Ont.: Steamers—City of Collingwood, Capt. W. J. Bassett, Engineer C. Robertson; City of Midland, Capt. F. X. La France, Engineer W. Whipps; City of Toronto, Capt. A. C. Cameron, Engineer D. McQuade; City of Parry Sound, Capt. E. Walton, Engineer J. L. Smith.

Hutchinson, John T., Cleveland: Steamers—Germanic, Capt. M. S. Place, Engineer Walter Thorn; Rube Richards, Capt. L. G. Vosburgh, Engineer Chas. Bacon; Queen of the West, Capt. C. V. Debeau, Engineer Chas. Hickey. Schooners—E. C. Hutchinson, Capt. T. K. Woodward; May Richards, Capt. J. Martin.

Lake Erie Transportation Co., Toledo, A. W. Colton, manager: Steamers—Geo. J. Gould, Capt. Henry Root, Engineer James Miller; S. C. Reynolds, Capt. Walter M. Cottrell, Engineer George Butler; Russell Sage, Capt. T. C. Herrick, Engineer Joseph Kohlbrenner; John C. Gault, Capt. C. H. Lewis, Engineer John Busted.

Menominee Transit Co., Cleveland: Steamers—Saxon, Capt. William C. Goodsell, Engineer Geo. E. Averill; German, Capt. William Baxter, Engineer Thos. Kelley; Briton, Capt. S. Stratton, Engineer Wm. R. Donaldson; Grecian, Capt. A. C. Chapman, Engineer O. H. Gilmore; Roman, Capt. A. J. Greenley, Engineer S. A. Wells.

Cleveland-Cliffs Iron Co., Cleveland: Steamers—Pontiac, Capt. James B. Lowe, Engineer F. B. Kelley; Frontenac, Capt. Samuel N. Murphy, Engineer E. V. Barry; Cadillac, Capt. George A. Symes, Engineer T. J. Reese; Pioneer, Capt. S. A. Lyons, Engineer E. J. Jenkins; Kaliyuga, Capt. Alex R. Robinson, Engineer Thos. Blain. Schooner—Fontana, Capt. A. C. Reimers.

Hawgood & Avery Transit Co., Cleveland: Steamers—Curry, Capt. George Robarge, Engineer James Norton; George F. Williams, Capt. T. C. Ellis, Engineer R. B. Buchanan; Servia, Capt. Fred Ahlstrom, Engineer Daniel D. Eagan; Geo. W. Morley, Capt. James Owen, Engineer John Chapman. Schooners—Moravia, Capt. A. C. Hansen; H. A. Hawgood, Capt. Philip Deroy; F. D. Ewen, Capt. Fred Watson.

Wilson Transit Co., Cleveland: Steamers—Andrew Carnegie, Capt. B. H. Jones, Engineer Fred Harmon; W. D. Rees, Capt. W. W. Dawley, Engineer Frank C. Stoeber; Yuma, Capt. Daniel Buie, Engineer John Skelly; Spokane, Capt. C. C. Tousley, Engineer James Derrig; Olympia, Capt. Wm. A. Williams, Engineer Wm. F. Gregory; Sitka, Capt. C. A. Benham, Engineer James Walsh; Yakima, Capt. A. M. Shephard, Engineer James McGuirk; Wallu'a, Capt. Alex Forbes, Engineer Henry Burton; C. Tower, Jr., Capt. Geo. Brock, Engineer Peter Lamar. Schooner—Yukon, Capt. Wm. Forbes.

Richardson, W. C., Cleveland: Steamers—Samuel Mitchell, Capt. Thomas Wilford, Engineer James Clancy; J. H. Wade, Capt. Charles M. Swartwood, Engineer Geo. McMonagle; J. H. Devereux, Capt. Charles R. Cleveland, Engineer Geo. B. Milne; Wm. Chisholm, Capt. Richard Call, Engineer Silas H. Hunter; Roumania, Capt. Lewis W. Stone, Engineer Martin J. Burns; J. H. Outwaite, Capt. Enos J. Burke, Engineer R. A. Davidson; Iroquois, Capt. Thomas Jones, Engineer Edwin W. Prince. Schooners—John J. Barlum, Capt. John McKeighan; H. A. Barr, Capt. Harry W. Phillips.

The Japanese seem to be following England in the matter of boilers for their big vessels of war. Messrs. Humphreys, Lez Mont & Co. have just placed an order with the French firm, Messrs. Delaunay, Belleville & Co., for boilers of the Belleville type to go into the Japanese iron clad which they are building. There are to be twenty-five boilers with economizers fitted to them, and the total indicated horse power will be 14,500. Time of delivery is fifteen months.



DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, Ohio,
by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient
binders sent, post paid, \$1.00. Advertising rates on application.

Entered at Cleveland Post Office as Second class Mail Matter.

The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels.....	1,792	924,630.51
Sailing vessels and barges.....	1,125	354,327.60
Canal boats.....	416	45,109.47
Total.....	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30, 1891.....	204	111,856.45
" " " 1892.....	169	45,968.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
" " " 1895.....	93	36,352.70
" " " 1896.....	117	108,782.38
Total.....	864	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895*	1894	1893	1895	1894	1893
No. vessel passages.....	17,956	14,491	11,008	3,434	3,352	3,341
Tonnage, net registered.....	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of navigation.....	231	234	219	365	365	365

* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about 1/2 per cent. of the whole, but largely in American vessels.

While such lake ports as Cleveland, Buffalo, Ashtabula and other places have issued, or are preparing to issue, municipal bonds to the extent of hundreds of thousands of dollars for the widening and improvement of rivers forming their inner harbors, Chicago manages, through the influence of senators and congressmen from Illinois, to have this same work done by the government. This action of the government favorable to Chicago is not in the line of fair treatment to the other lake cities, but from the standpoint that improvements in the Chicago river are of advantage to the shipping interests of the lakes as a whole, there is no cause for complaint. When river and harbor appropriations under the continuous contract system were being apportioned in the last congress, the sum of \$700,000 was provided for dredging in the Chicago river, on the claim that the river is under the direction of the war department. Rivers forming inner harbors at other ports are not deepened or improved by the government. Shore lines are established and the government maintains harbor entrances and harbors of refuge outside such shore lines, but the municipalities bear all expenses of improvements within the shore lines. But such is not the case in Chicago. The \$700,000 was to apply to dredging throughout the main portion of the river. Now it has been found that the amount needed for dredging will probably not exceed \$180,000, and Senator Cullom, who is on the appropriations committee of the senate, has secured the passage of an amendment to the sundry civil appropriation bill permitting the balance of \$520,000 being available for straightening and widening the river. Great is the ability of Chicago to get whatever she goes after.

The immigration bill which President Cleveland vetoed on Tuesday contained certain clauses of special interest to the lakes. If the bill had received the approval of the president, it is more than likely that these clauses, which were intended mainly to prevent Canadians from holding employment in border cities like Detroit, Port Huron and other places on the Detroit and St. Clair rivers, would have been construed to apply to a very large number of men who live in Canada during the winter but who are employed regularly on lake vessels during the navigation season. It is fully understood, of course, that United States laws are against foreigners acting as officers on American vessels, but the effect of this bill, if it had not been vetoed by the president, would have been to exclude from the vessels everybody who was a resident of Canada. Members of the Canadian parliament threatened retaliation in various forms if the bill should be made

a law, notably the abolition of reciprocity in wrecking on the lakes, but it is not probable that the president's veto was prompted by these threats. It has been fully understood for some time past that he was opposed to the main restrictions of the bill, which related to a standard of intelligence among immigrants. The subject is certain to come up again in the next congress, as there were no party lines in the vote that resulted in the bill going to the president.

In a communication elsewhere in this issue, Mr. Frank J. Firth of Philadelphia, who is one of the vice-presidents of the Lake Carriers' Association, directs attention to the benefits derived by lake shipping interests from wise coasting regulations established by the government. This point is brought out by a short preliminary reference to the subject "Restoration of the American Merchant Marine." Mr. Firth is chairman of a committee recently appointed to act with representatives of ship builders and ship owners from all parts of the country in suggesting to the new administration a measure of assistance for American shipping. His communication indicates a thorough interest in this great question and a practical knowledge of the subject. He promises a further explanation of his views that will undoubtedly prove interesting to readers of the Review.

Vessel owners at Toronto are wrestling with a bridge proposition that would not be given a moment's consideration in any of the American lake cities, especially if the commerce was anywhere near as large as it is in Toronto harbor. Promoters of a summer resort enterprise are trying to block the main entrance to the harbor with a swing bridge for trolley cars that will probably be on five-minute service. Toronto harbor is formed by a semi-circular island of sand, through which there are two entrances. The western entrance is the chief one, and is indeed the only one that can be used in stormy weather. But notwithstanding this condition as regards the shipping of the port, it is proposed to erect a swing bridge over this western entrance—breakwater and all—with a stone abutment in the center of the channel from which the bridge is to swing.

It is understood that Capt. Robley D. Evans, U. S. N., who was spoken of as the probable successor of Rear Admiral Walker of the light-house board, is in favor with the new administration as well as the retiring heads of the government, and that he may yet be at the head of the board. Admiral Walker retires about the 20th inst. An effort was made to induce him to retire before March 4, and thus permit the reorganization of the board, but instead of doing so he is said to have sought, through act of congress, retention for five years on the active list. There are quite a few candidates among naval officers for the position on the board that will be vacant upon the retirement of the president.

An elegant photo-gravure of the United States frigate Constitution (Old Ironsides) has just been issued by A. W. Elson of Boston. Nothing inanimate appeals to the hearts of the American people as does this war ship. "Old Ironsides" is at present at Portsmouth, N. H., housed over. The photo-gravure represents her as she was in her prime. It is from a painting by Marshall Johnson, who obtained knowledge of his subject from a careful study of the Constitution and from men who had sailed upon her. As a result of his studies the picture is historically accurate. The plate is printed on India paper, mounted on heavy plate paper, 28 by 38 inches; the size of the work is 16 1/2 by 21.

It is said that with the aid of special telegraphic facilities and long-distance telephone connections the ore transportation business of the Carnegie Steel Co. on the lakes, resulting from the Rockefeller-Carnegie contract, will be managed largely from Pittsburg. An increase in the Carnegie company's office force in Cleveland will be necessary, of course, but it is understood that the movement of the ore from the mines to shipping ports and from Lake Erie docks to furnaces will be under the direction of Mr. Curry of Pittsburg, who has for some years past been in charge of the ore business of the Carnegie company.

Solid through sleeping car trains with dining cars attached are operated by the Nickel Plate road between Chicago, Cleveland, Buffalo and New York City. Through sleeping car to Boston. 3 Mar 31

The Review has excellent photographs of lake ships.

Steel Forgings for Marine Engines.

The Marine Journal of New York in a recent issue, gives a list of about a dozen large ocean vessels which have broken their shafts during the past two months. The list of casualties might be considerably augmented if information was at hand regarding all the similar but smaller breakages of which no record is kept. Lake vessel owners were reminded of the fact that there is a similar mortality of shafts, crank pins and other forged parts of marine engines on lake vessels by the paper read before the Lake Carriers' Association at Detroit in January last, by Mr. H. F. J. Porter, western representative of the Bethlehem Iron Co., who had a long list of accidents of this kind which happened during the past year, and which had been compiled for him by some of his friends among the marine insurance agents. These accidents are occurring from time to time and we read of them casually, but as no one keeps a complete record of them we do not realize how important a duty forgings play among the component parts of marine engines. The character of vessels on the lakes is gradually changing and approaching rapidly the type of vessel which is built for ocean trade. Within a few years we have changed from small wooden vessels to vessels heavily strapped with iron; then to composite and iron vessels, and again to vessels entirely of steel, even as regards deck houses and spars. We are now undergoing a final change from iron to steel forgings.

In the paper read before the Lake Carriers' Association by Mr. Porter, the comparative merits of iron and steel forgings were very clearly shown and the advantages were pointed out of having lighter and stronger parts by using steel instead of iron. The importance of this subject to the vessel owners is apparent from the fact that they asked Mr. Porter to repeat his address at their next annual meeting, and requested him to add to it any new information that he might be able to collect during the present year. Some extracts printed herewith, from a paper recently read by Mr. Porter before a scientific body in Chicago, are of interest in considering the subject.

"It is the duty of the designing engineer to make the parts of his engines as light and as strong as possible, and it is for these reasons that the weaker and less reliable admixture known as wrought iron is gradually being replaced by the stronger metal, steel. In cases where economy in space and weight is required, the still stronger alloy, known as nickel steel, is rapidly coming into use. The old idea that wrought iron was more reliable than steel on account of its fibrous nature has given way now that we understand how to properly manufacture steel. The impression used to prevail among those who had not given the matter careful consideration that the characteristic difference between wrought iron and steel was that the former was essentially fibrous, whereas the latter was crystalline in its structure; and that wrought iron, on account of its fibre, was tougher and more tenacious, whereas steel was apt to snap off suddenly. It was also supposed that it was only when wrought iron was subjected to sudden shock and vibration its structure would assume a crystalline character, and that it would then break like steel. We know that these ideas are very primitive; that all metals are by nature crystalline, wrought iron with the rest. All metals in cooling from a liquid to a solid state solidify by crystallization. This is the only period when crystallization can take place, and vibration and shock have nothing to do with making wrought iron crystalline, for it is already in that condition. As far back as twelve years ago, Prof. Thomas Egleston, of the School of Mines, Columbia College, New York city, in a discussion of this subject at a meeting of the American Society of Mechanical Engineers, said: 'With regard to fibrous iron, there is no such thing. It is an appearance, not a quality. Etching with acid does not prove the fibrous structure, since all iron contains a considerable amount of slag easily soluble in acids. This in a rolled bar will be distributed more or less uniformly in the direction in which the bar has been rolled, and when acted upon by acid will be eaten out in more or less parallel layers from the outside. When the action is continued, this appearance of parallelism disappears, as it is only superficial. If the same iron is submitted in a tube to a current of chlorine gas, the whole of the iron will be dissolved out and a mass of exactly the same shape as the iron will be left behind, which is exceedingly light and porous, and which is slag. If this be examined it will be seen to have a sort of pseudo-laminated structure running through its mass, which brings long strings of it to the outside of the iron, giving the pseudo-fibrous appearance to the piece when it is etched. If the end of any fractured bar which has the pseudo-fibrous structure is

examined with a glass, each so-called fibre will be seen to be the face of a crystal. It is the drawing out of the ends of these crystals which produces the change of color in the mass which gives the pseudo-fibrous appearance. If the surface was highly magnified there would be no fibrous appearance.'

"Mr. Bayles of the Iron Age said also: 'My opinion on this subject was formed long ago, and has since been strengthened by observation and experiment. Among the first questions which I was called upon to discuss under conditions imposing a professional responsibility was this very question of the crystallization of wrought iron. While seeking evidence on the subject I was invited by the manager of a rolling mill in Pennsylvania to witness some simple experiments, and from these I learned a great deal. In the blacksmith shop attached to the mill a number of test pieces of high quality merchant bar were tested. These pieces were nicked and turned over the horn of the anvil. They developed a fracture more like that of seasoned hickory wood than anything else to which I can compare it. The metal tore open with a long, silky fibrous fracture, showing a quality as good as had ever been attained in iron making up to that time. Six inches further along the same bar a second nick was made, and without any apparent difference in the manner of striking it, the iron was broken short off, showing a structure so apparently crystalline that one might imagine it was anything but good wrought iron. I found upon investigation that this was simply a blacksmith's trick, and that such results could be produced at pleasure, the character of the fracture depending entirely upon the manner in which the metal was struck after nicking. At first I was somewhat skeptical on this point, deeming it probable that the shocks and stresses of tearing the fiber apart in the first test had produced certain structural changes which accounted for the appearance of the fracture occasioned in breaking it short off. This, however, was disproved in a very few minutes, it being as easy for the blacksmith to produce the crystalline fracture first and fibrous fracture afterwards as to reverse the order. These facts have been touched upon by some of the gentlemen who have already spoken, but they do not seem to have given the fact that a piece of new iron can show both a fibrous and crystalline structure within a space of two or three inches, as much weight as it seems to me entitled to as evidence with regard to the cold crystallization of iron. From such study of iron structure as I have had opportunity of making, I have reached the conclusion that talking about the crystallization of iron is much the same thing as talking about the crystallization of sugar and salt. It cannot pass from the plastic to the solid state in any other way than by crystallization. Whatever we may be able to do with it in the way of shop manipulation, we can not give it a structure other than crystalline. In rolling iron important structural changes are produced. Crystals are more or less distorted, and are so displaced that they form, with the aid of the cinder, what we commonly call the fibrous structure. The crystals remain, however, and I have never seen a piece of iron polished and etched with weak acid in which a well defined crystalline structure was not distinctly visible. If, therefore, we find in iron which is broken an apparently crystalline structure, there is no occasion for surprise. The question is not whether it has become crystalline as the result of shocks and stresses, but what changes have been produced by these means which render the metal more brittle than when first wrought into form. This is a question quite separate and distinct from that presented at present for discussion. No fact has ever been brought to my notice which has seemed to me to warrant the conclusion that any crystals had developed in cold iron which were not there before it had cooled.'

"What is needed for our forgings is a metal free from slag and such mechanically mixed impurities, so that the force of molecular attraction can act upon adjacent crystals and thus hold the mass together. Such a metal can be obtained by the melting process only, by which steel is produced, thus allowing all foreign substances to float to the top and be taken off. Steel in its mildest form is recognized as at least one-third stronger than wrought iron. Higher grades of steel are from twice to three times its strength. In these days of close competition, the carrying capacity of our lake vessels can be increased by reducing the size, and thereby the weight, of engine forgings, by making them of steel instead of iron. Or, if the original sizes of the wrought iron forgings be adhered to, as steel substitutes would be so much stronger, higher speed might be attempted and thus more cargoes be carried in a season. As steel will take a higher polish than iron, friction will be less and less power will be required. As less breaks will occur, if the price is higher, this advance can be looked upon in the nature of insurance."

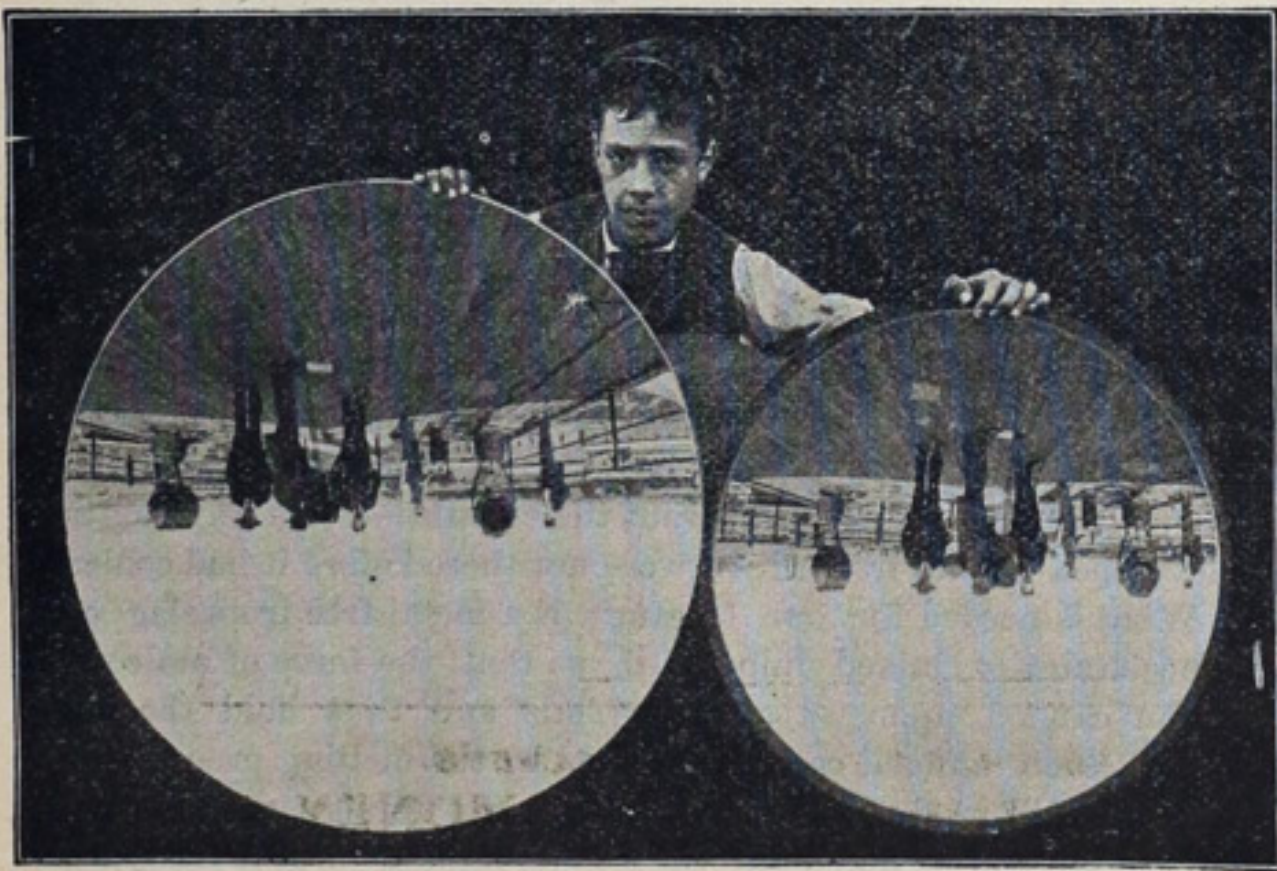
Modern Search Lights.

The use of electric search lights on board vessels, not only of the navy, but also those of the merchant marine, as well as on yachts, has, within recent years, been steadily growing, as improvements in the mirrors and the operating and controlling mechanism have given to vessel owners and the government reliable projectors. The search light is now a necessary part of the equipment of naval vessels, and all passenger ships or steam yachts of any pretensions have pilot house projectors. In the manufacture of a perfect search light there are two main



SEARCH LIGHT TESTING TOWER, SCHENECTADY WORKS OF THE GENERAL ELECTRIC CO.

parts, the lamp and the reflecting surface, each of which must of itself be perfect. Unless the greatest of care is given to the design and workmanship of the lamp and the grinding and polishing of the mirror, the result must be failure or only semi-success. Up to quite recently, the mirrors for search-lights manufactured in this country were imported from Germany and France, but when the General Electric Co. decided upon the manufacture of projectors on an extensive scale, it cast about for a manufacturing optician who could be trusted to develop mirrors of as high a grade as those of European make. At the works of the General company in Schenectady, N. Y., one entire department is now occupied in the manufacture of projectors. On one of the large number of buildings a square tower has been erected carrying a railed platform, and it is from this tower that tests are made of the power and range of the search light beams, which sweep over the wide expanse of the valley of the Mohawk. A system of distance and intensity has been calculated, by which the carrying power of the beam is gauged and the capacity of the projector tested.



SEARCH LIGHT REFLECTORS.

The light reflecting surface is a silvered glass concave lens, so ground that when the arc of the lamp is in its focus the reflector beams which proceed from the mirror are parallel. Two types are used, the Mangin and the parabolic, the former having two spherical surfaces of different radii, the reflection and refraction causing the rays to be projected in straight lines, and the latter having true parabolic surfaces. Still a third type, the hyperbolic, is used where the illumination of a

large area at short range is desired, but in this case the mirrors are of metal silvered. Lamps are of two types, inclined and horizontal, according to the position occupied by the carbons. Both lamps are automatic and focus in feeding. The first type is used in the 12-inch projector, with either type in the 18-inch, while for larger sizes the horizontal type has been found the most suitable. All the lamps are designed to operate on direct current incandescent circuits, a regulating rheostat being connected in series with the lamp to bring the voltage to that point at which the best results can be obtained, which is from 40 to 60 volts according to the current taken.

In order that the person controlling the direction of the beam may most satisfactorily direct it, three systems of control have been devised—pilot house, rope and electrical, depending upon the location of the projector. Electrical control can be applied to any size, but is best suited to the 24-inch and larger sizes. Horizontal and vertical movement of the drum containing both lamp and mirrors is given by two small motors, which are concealed in the pedestal at the base, and controlled by a single lever set on a small pedestal containing the resistance and switches. By throwing certain disengaging clutches the electrical control may be cut off and the projector controlled by hand. Electrical control allows the projector to be operated from a point almost any distance from it. The same result may also be attained at less cost by means of the rope control, horizontal and vertical movement also being attained by the movement of a single lever. In this case, however, the distance between operator and lamp must necessarily be limited. When the projector is set on the pilot house of a steamer, pilot house control is usually employed, the actuating rod passing down through the roof of the pilot house, and terminating in a lever movement, which gives the necessary horizontal and vertical deflection to the beam.

The standard sizes of these search lights are based on diameters of the reflecting lenses—12, 18, 24, 30, 36 and 60 inches. The greatest search light in the world, that exhibited by the General company at the Chicago exposition, was of the 60-inch type. This light is now on the top of Mount Lowe in California, from which point its beams are visible many miles over the waters of the Pacific.

Roberts Water tube boilers seem to be in special favor on steam vessels in use by various departments of the government. Among vessels of this kind to which Roberts boilers have been furnished are the following: Snag boat Mandan on upper Missouri river; dredges, Ohio and Oswego on Ohio river; commandant's barge Minnie, Brooklyn navy yard; torpedo planter Dyne, Whitestone station; revenue cutter Penrose, Pensacola station; revenue cutter Tybee, Savannah station; revenue cutters Scout and Guard, Puget sound station; revenue cutter Johnson, Detroit station; war department steamer Reid Whitford, Georgetown station; war department steamer Angler, Savannah station; war department steamer Gen. Geo. Thom, Newbern station; United States harbor supervisor's steamer Alert, New York station; United States harbor supervisor's steamer Active, New York station; United States harbor supervisor's steamer Argus, New York station.

Roberts boilers are also used in the New York city police boat Inspector, the New York city dumping boat Cinder-Ella, and the quarantine commissioner's steamer State of New York.

It is quite probable that the big Northern line passenger steamers North West and North Land will next season make a better showing on time schedules than they have made at any time since they were built. Engines and boilers have been undergoing a general overhauling all winter and it is announced now that the chief engineers will be two men who have had considerable experience with Belleville boilers on ocean-going ships, and who will give attention mainly to the boilers, as they will have other first-class engineers to look after the engines.

Solid through sleeping car trains with dining cars attached are operated by the Nickel Plate road between Chicago, Cleveland, Buffalo and New York City. Through sleeping car to Boston. 3 Mar 31

U. S. ENGINEER OFFICE, 1101 D. S. Morgan Building, Buffalo, N. Y., February 15, 1897. Sealed proposals for harbor excavation and construction of timber and concrete breakwater at Dunkirk Harbor, N. Y., under continuous contract, will be received here until 11 o'clock A. M., Monday, March 22, 1897, and then opened. Information furnished on application. T. W. SYMONS, Major, Engrs. Mar. 11

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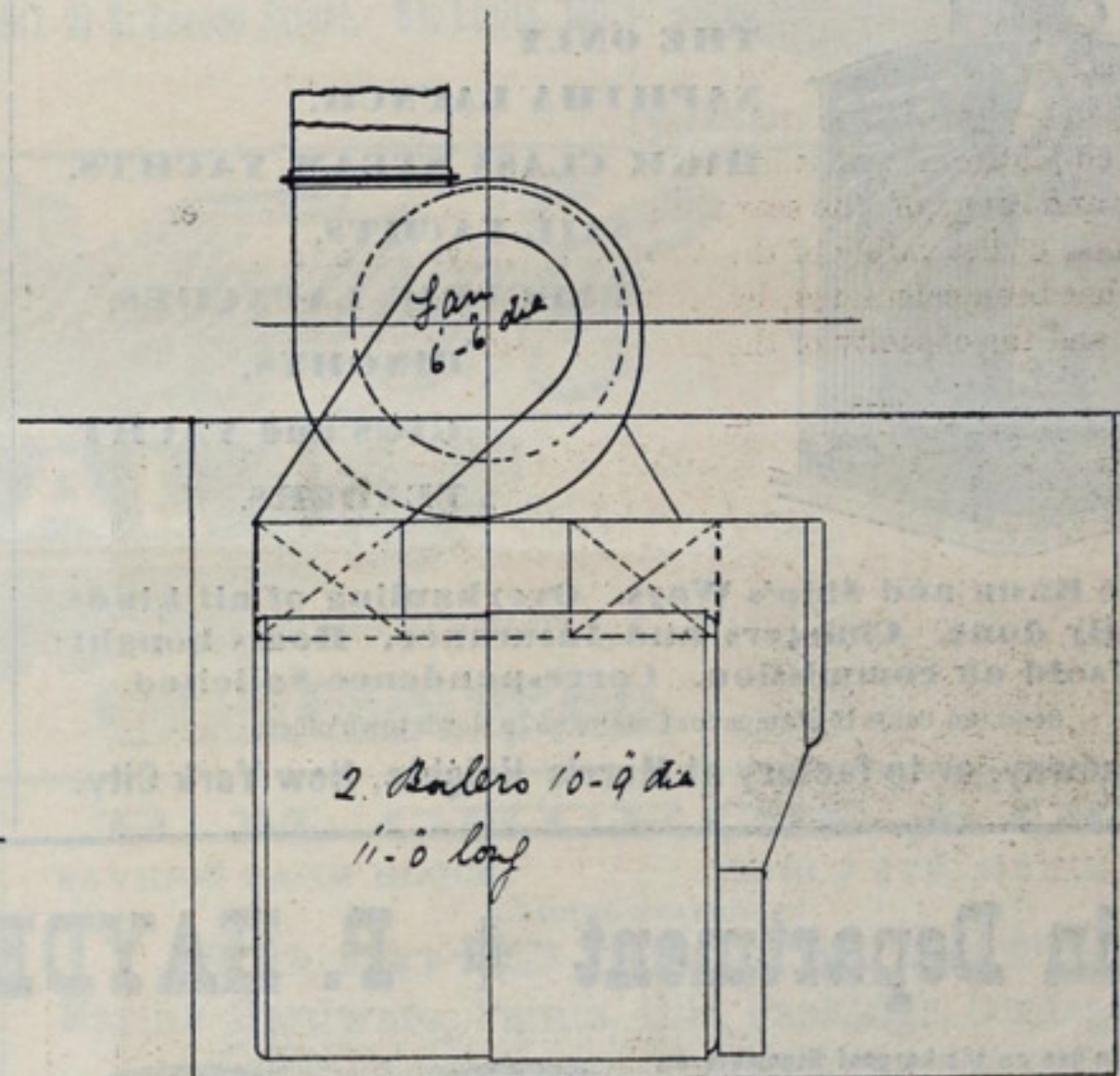
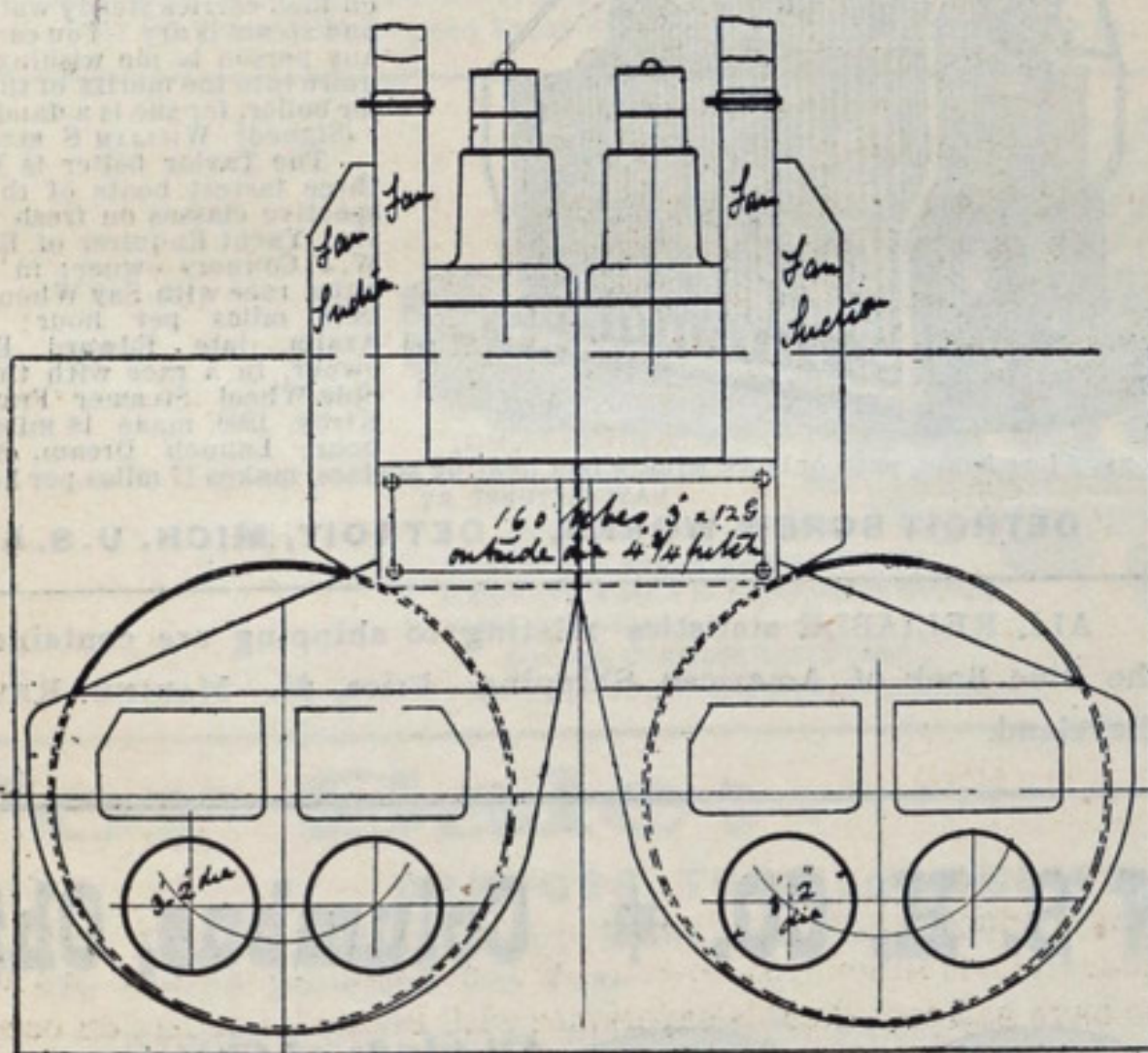
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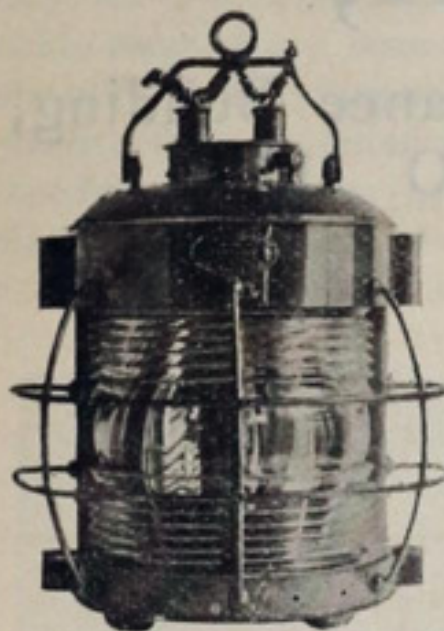
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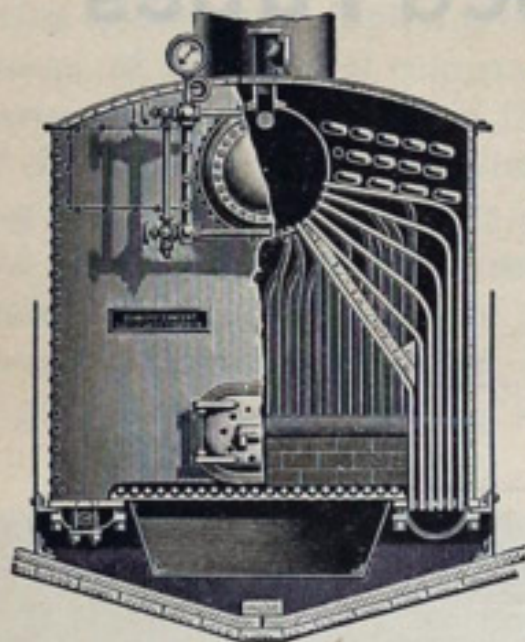
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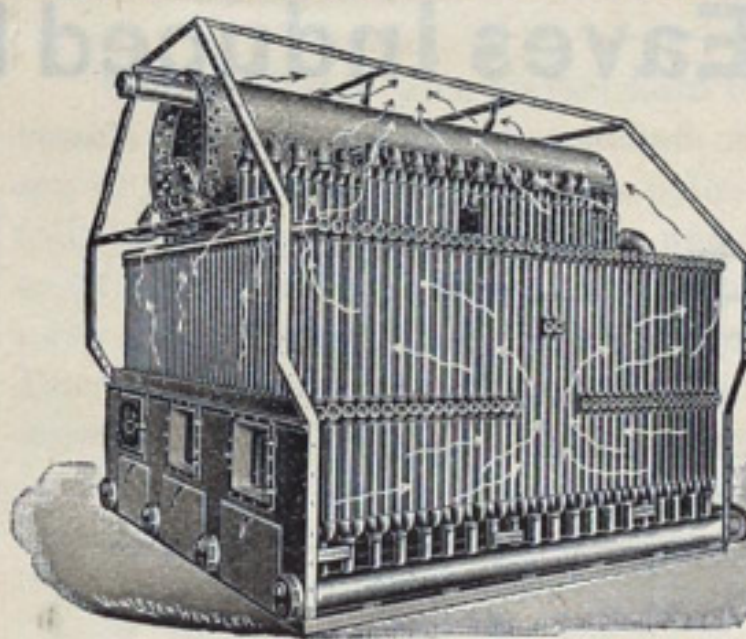
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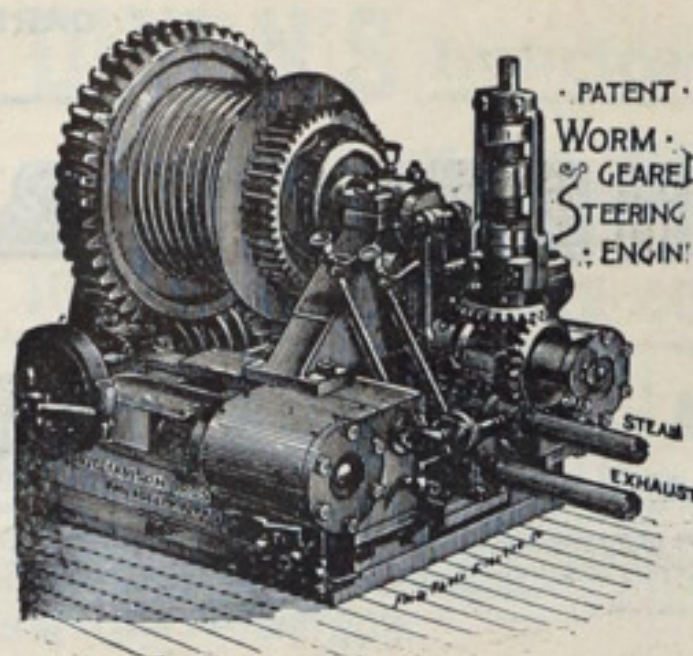
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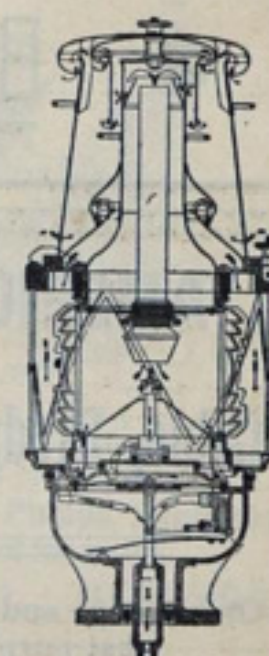
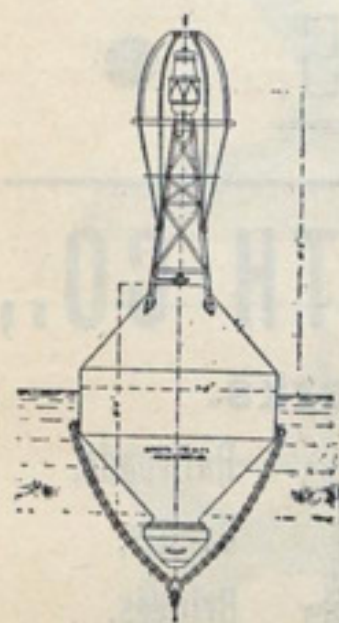
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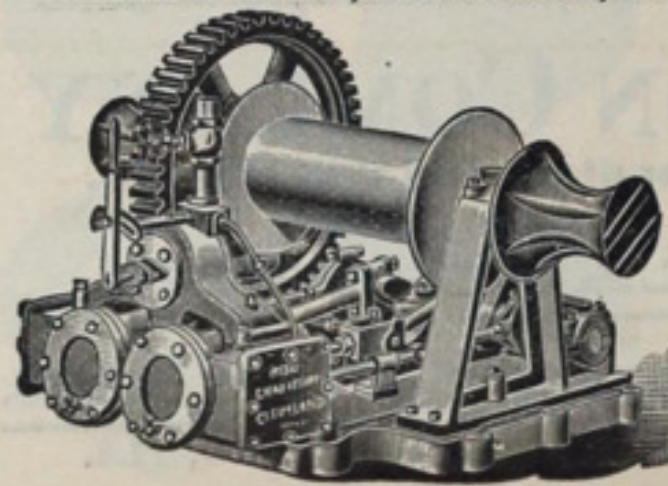
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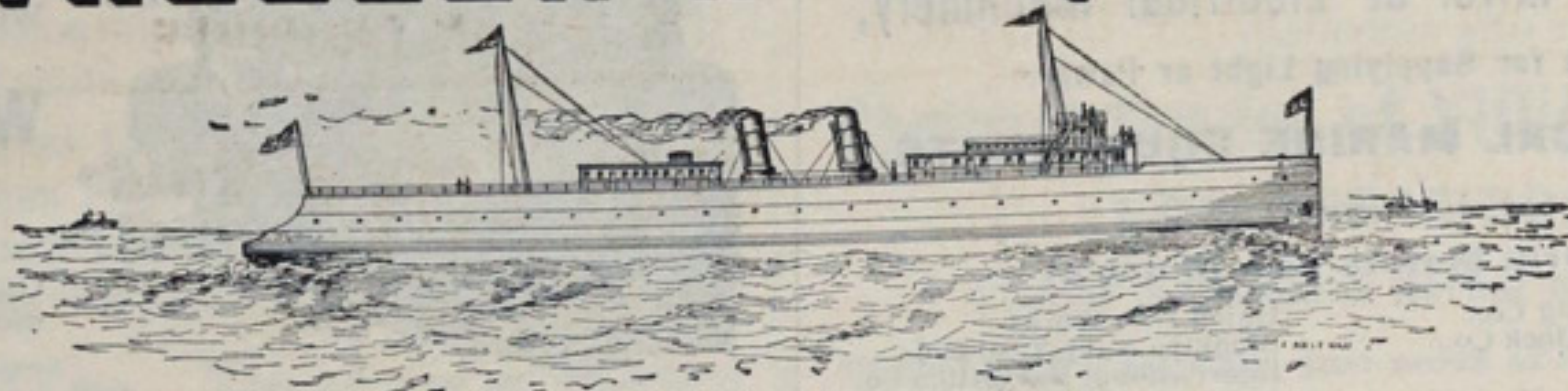
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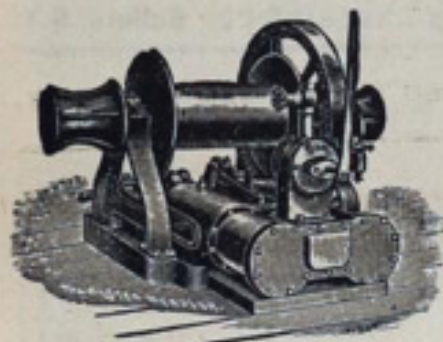
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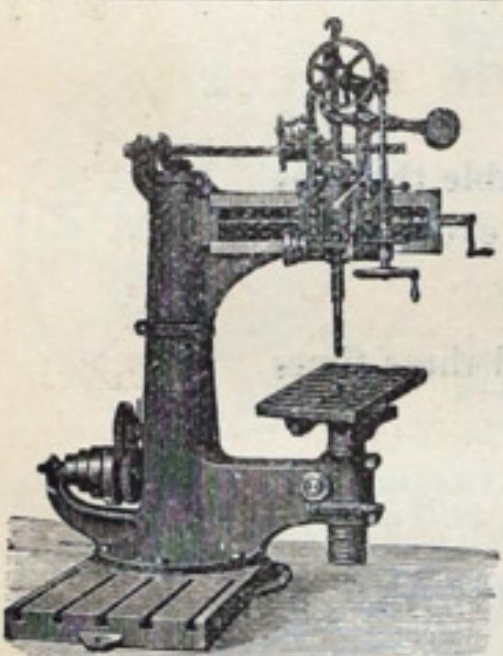
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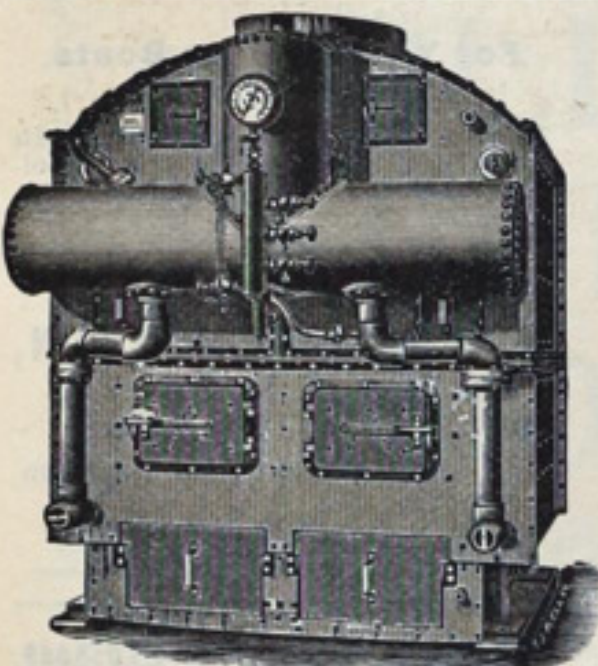
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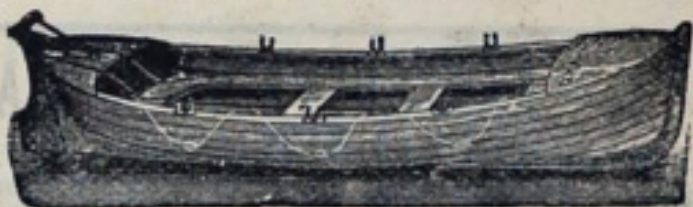
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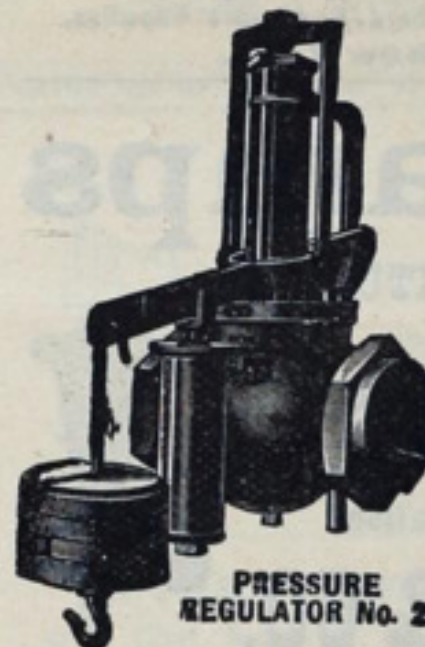
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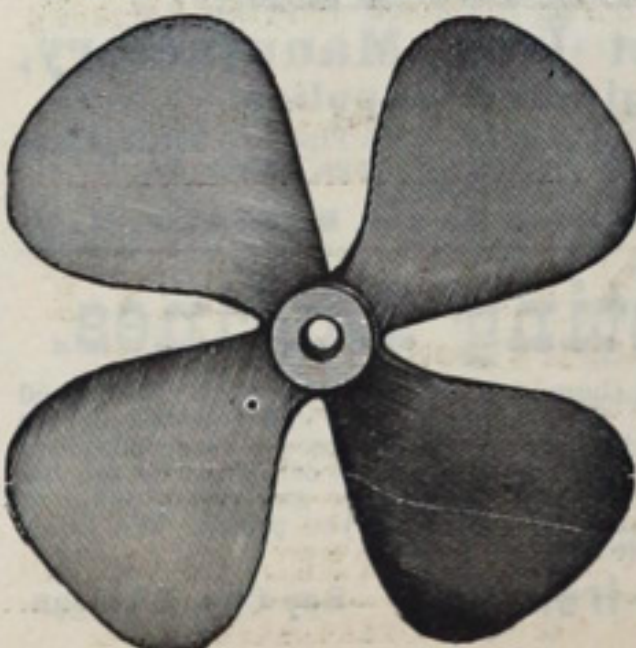
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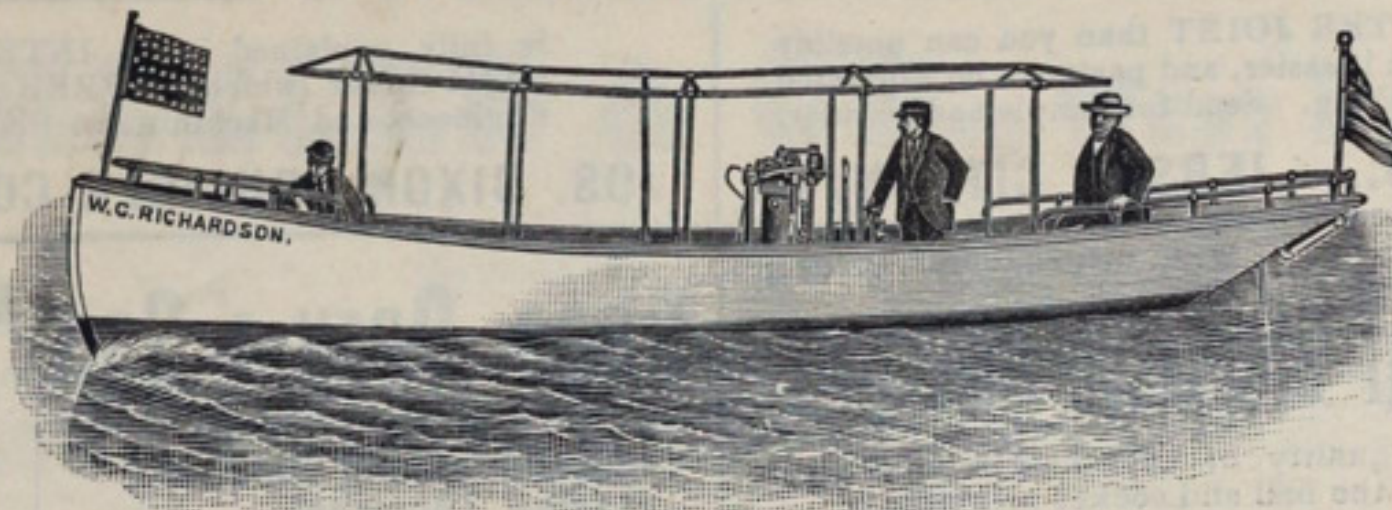
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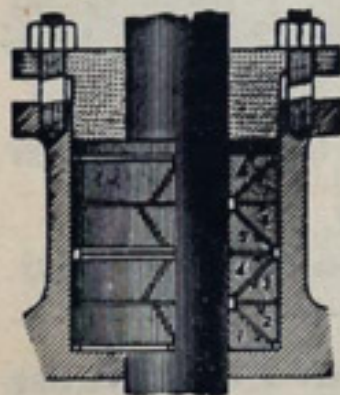
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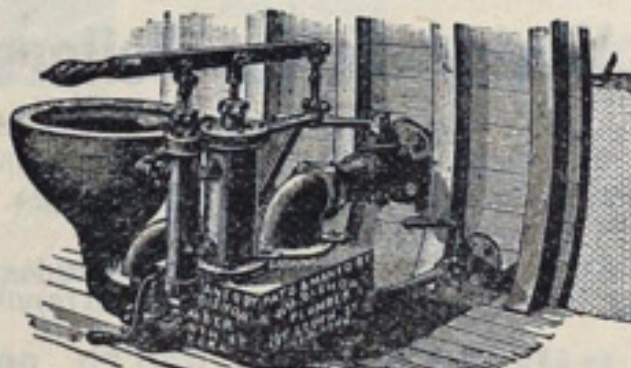
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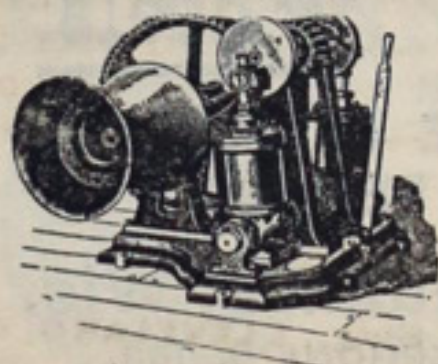
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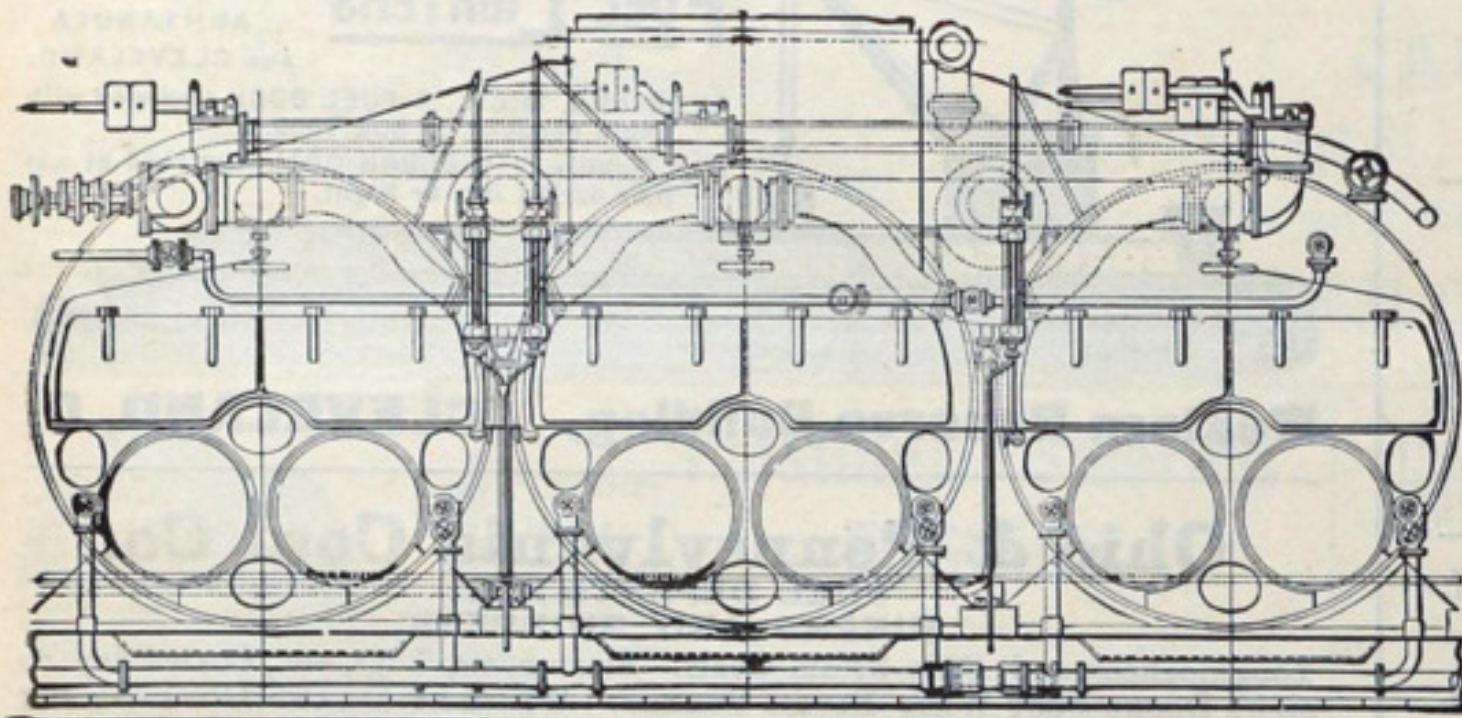
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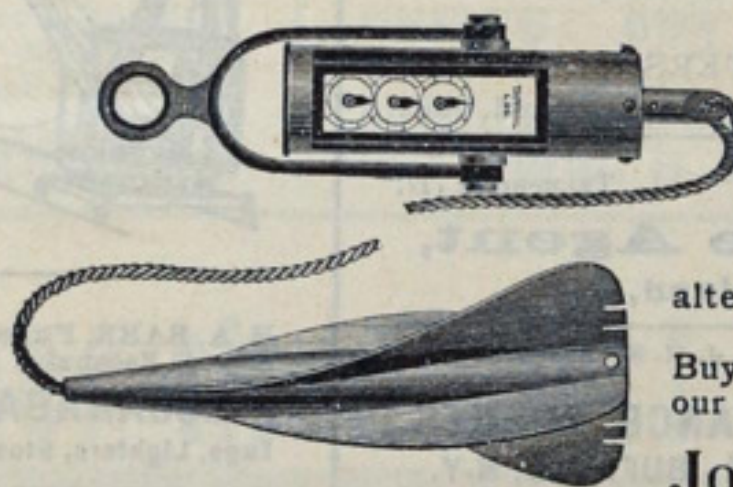
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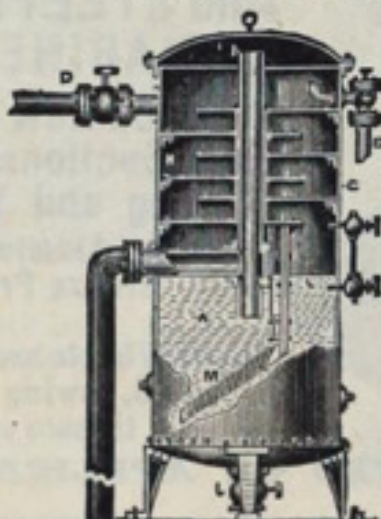
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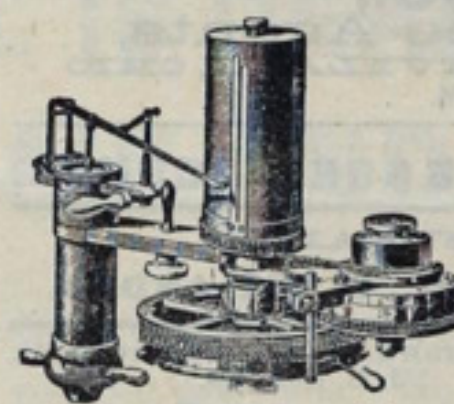
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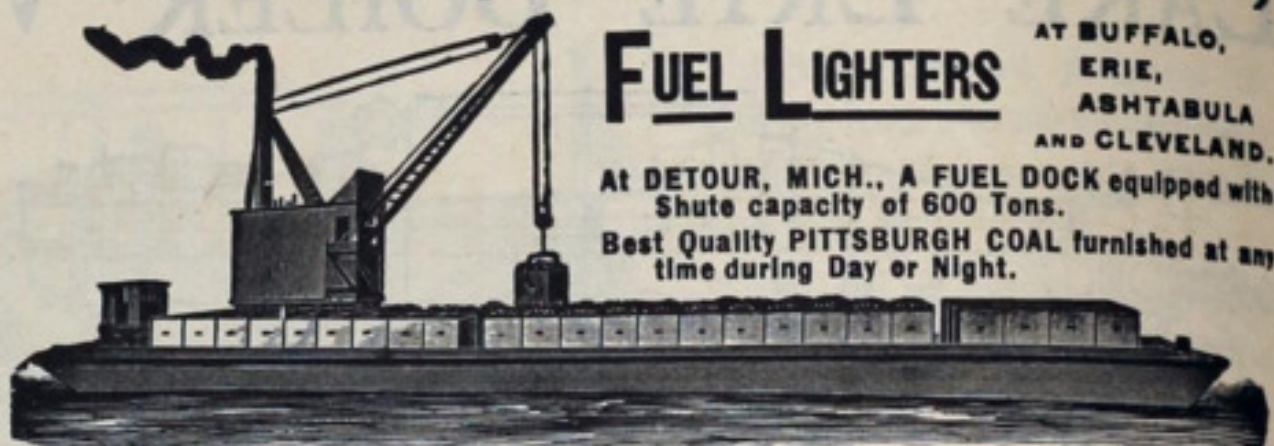
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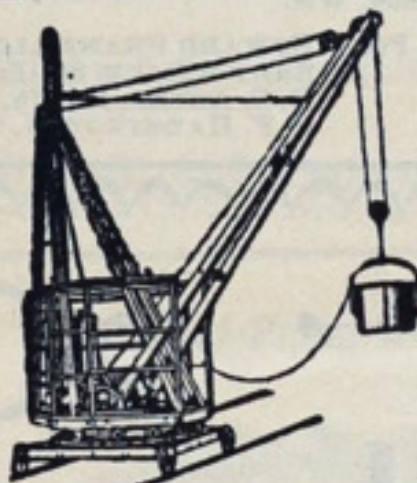
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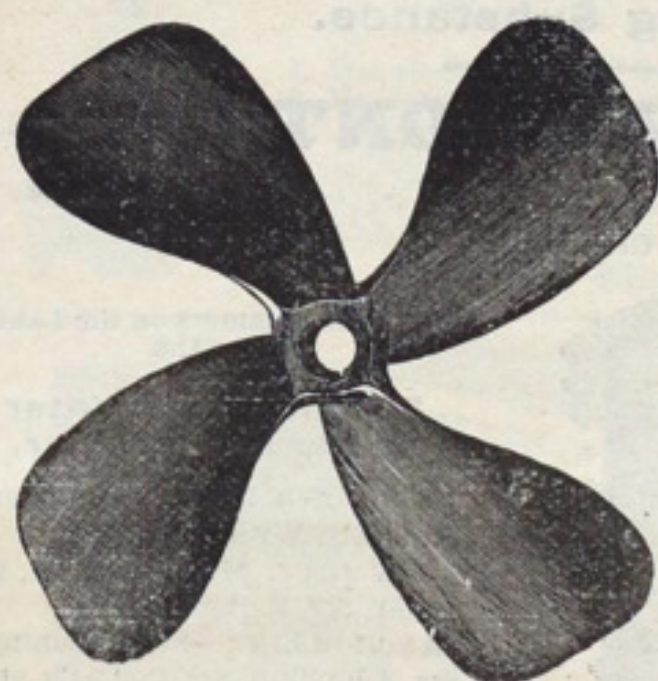
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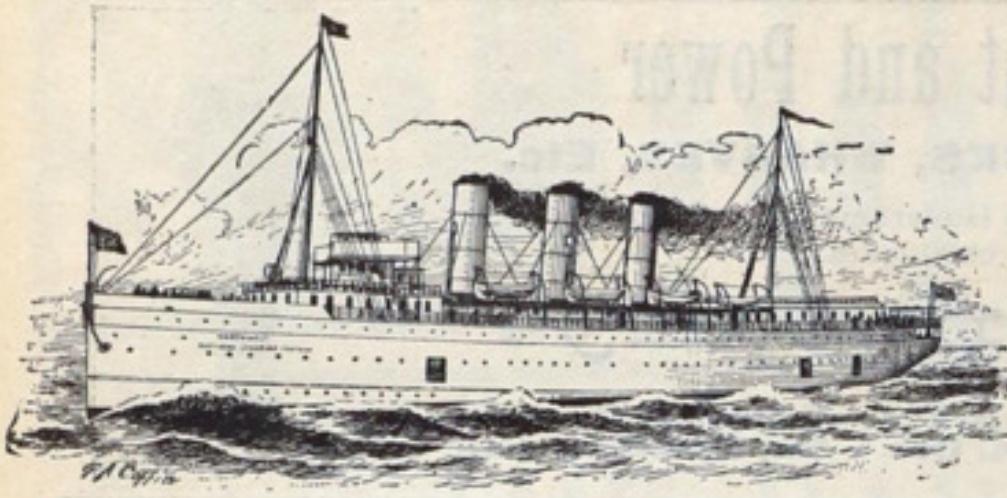


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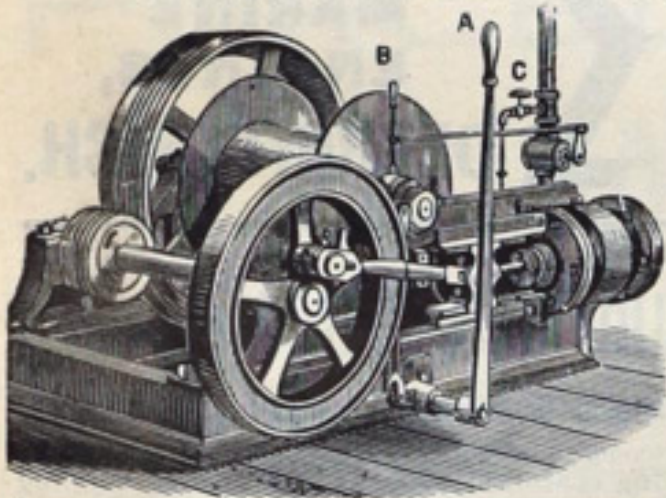
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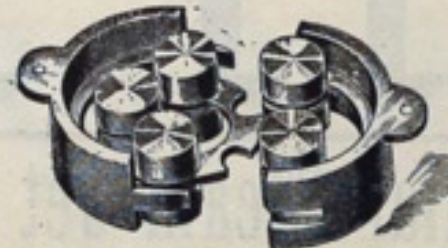
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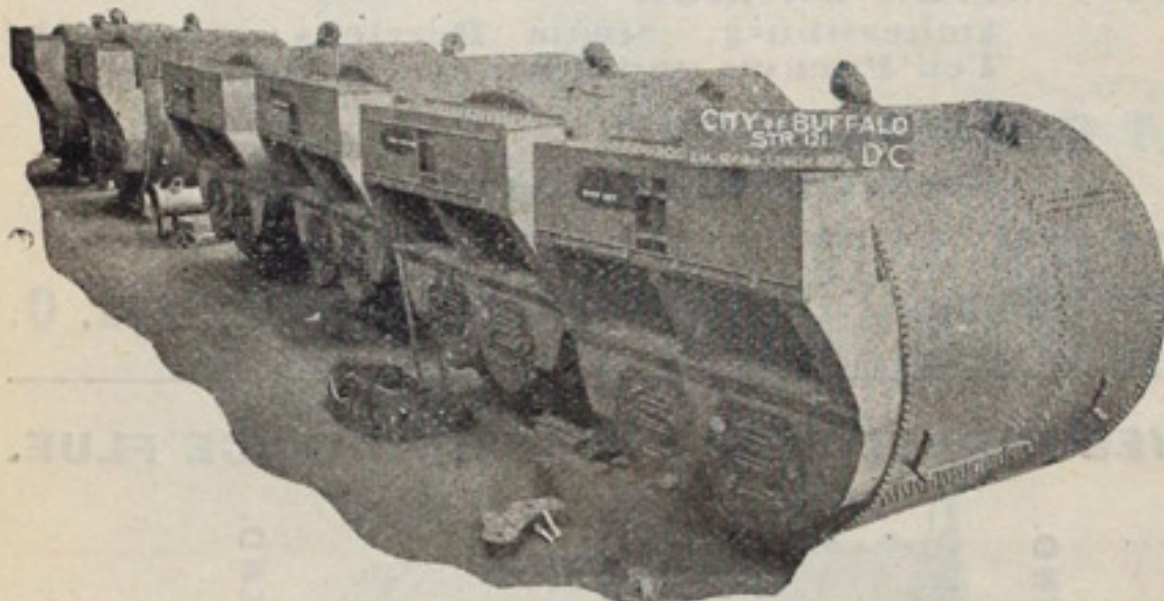
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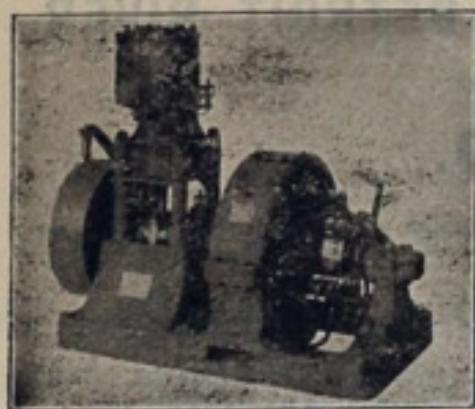
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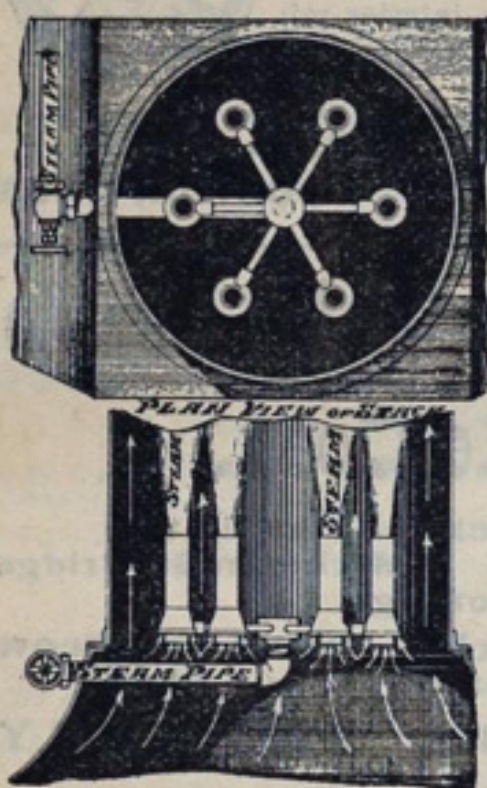
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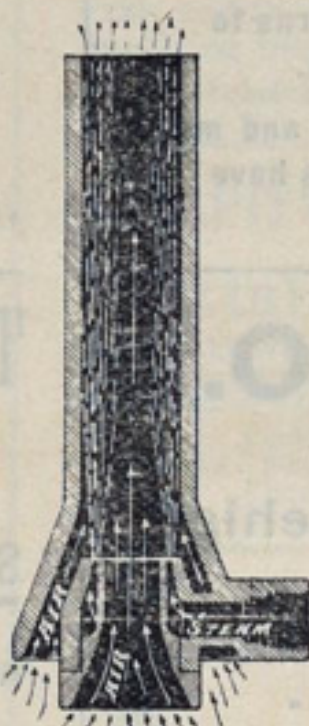
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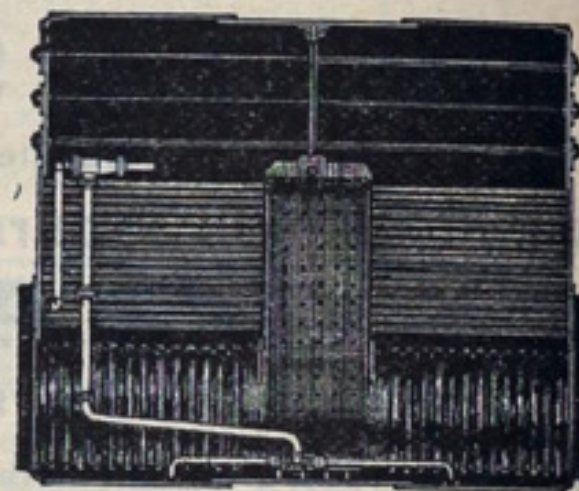
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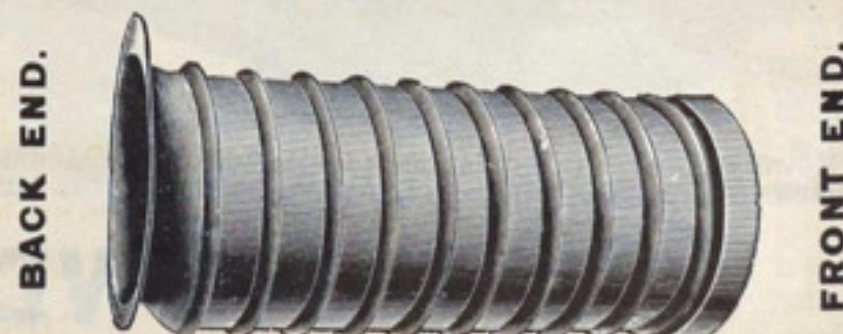
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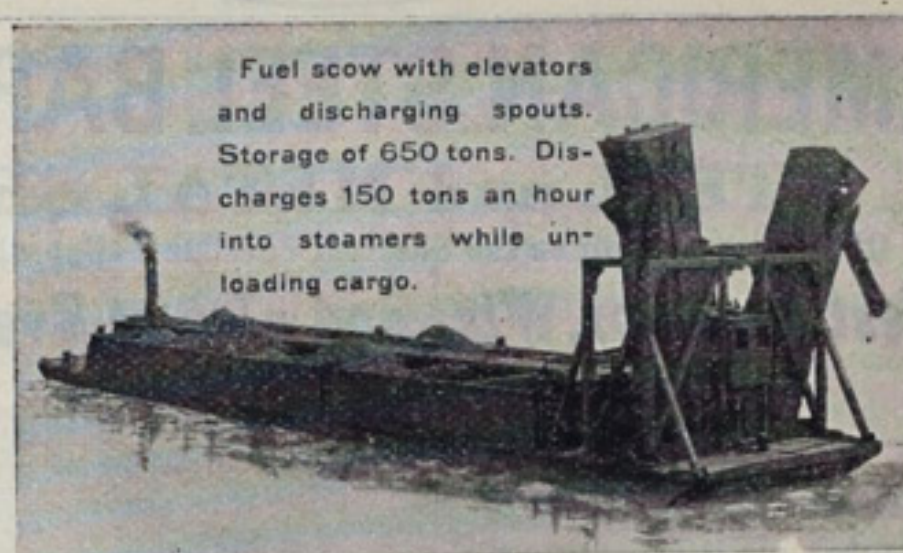
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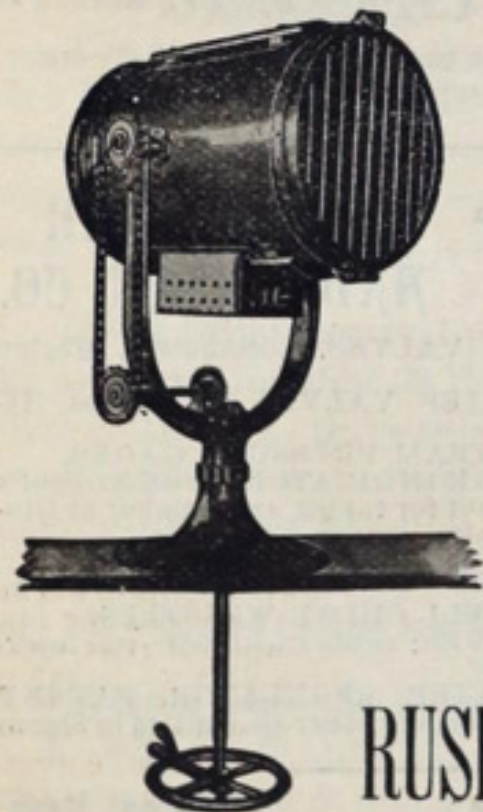
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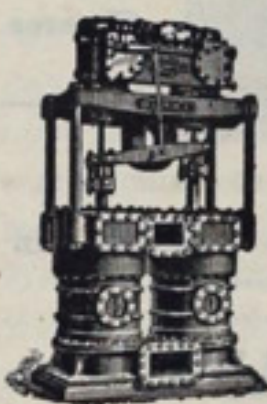
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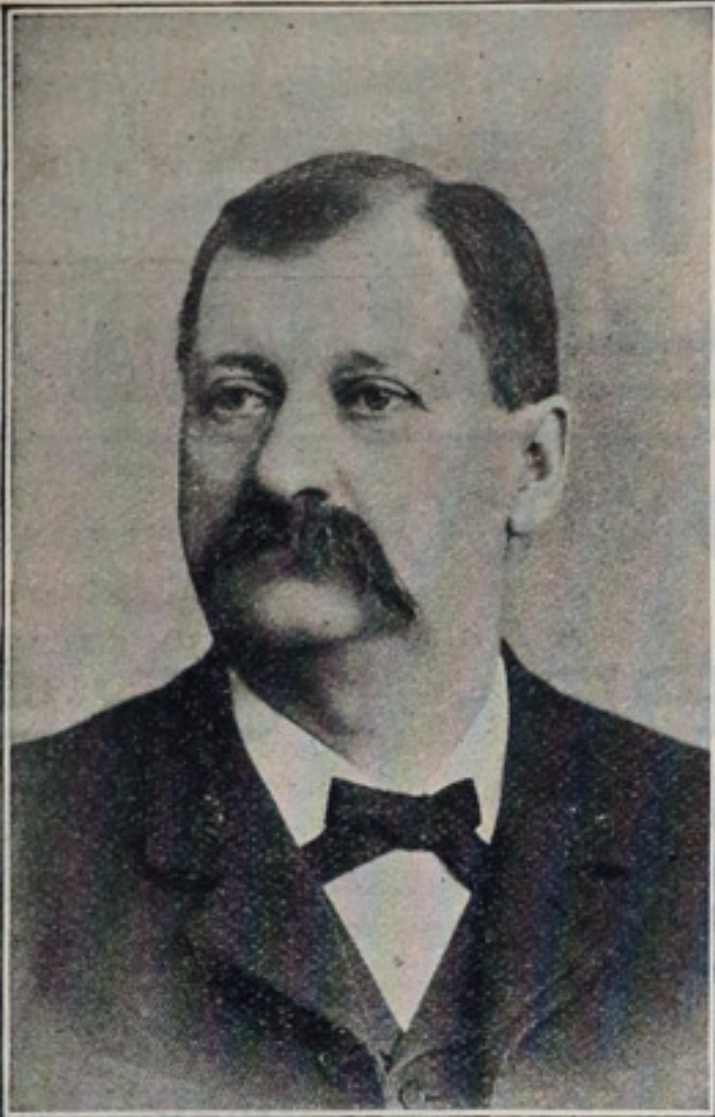
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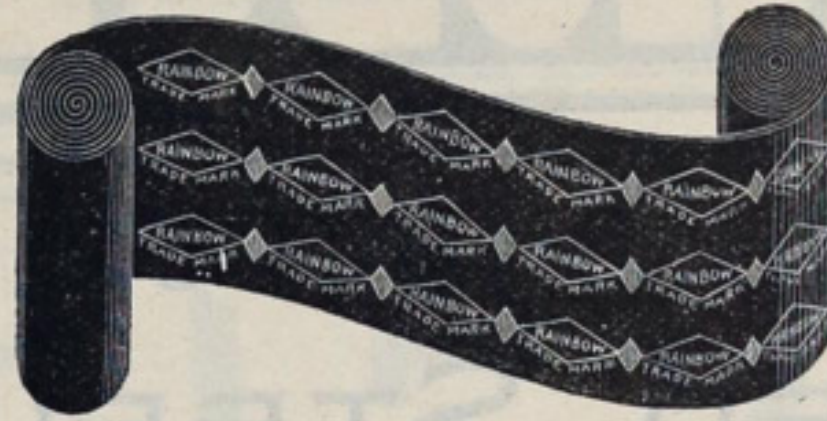


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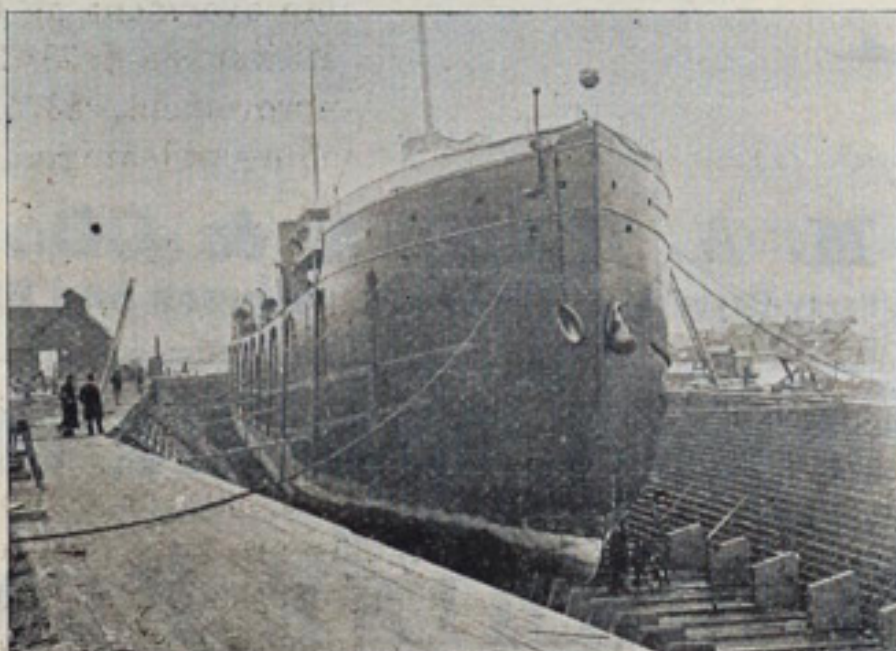


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Breadth, Bottom.....52 "	Depth over Sills.....18 "

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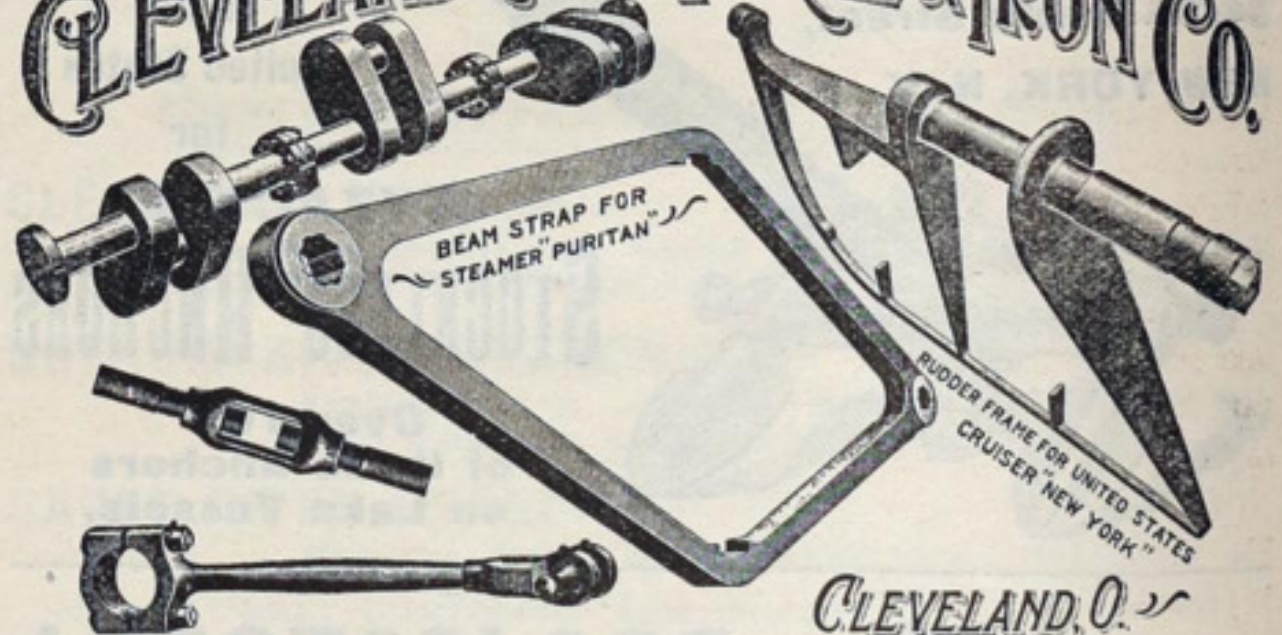
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Dimensions of Dock:
Lth. over all, 360 ft.
Lth. on blocks, 340 ft.
Width of gate, 60 ft.
Depth over sill, 20 ft.

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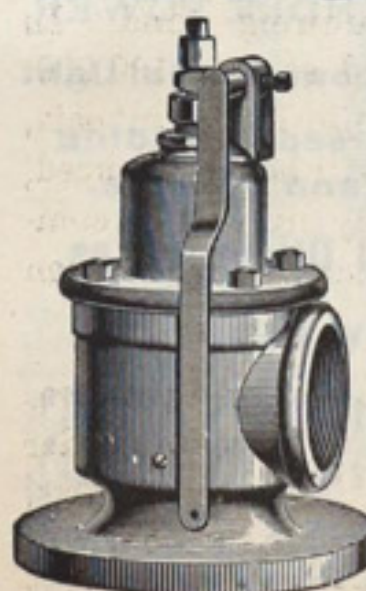


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